CHNOLOGY DEPT.

OCTOBER 1951

The Paper Industry

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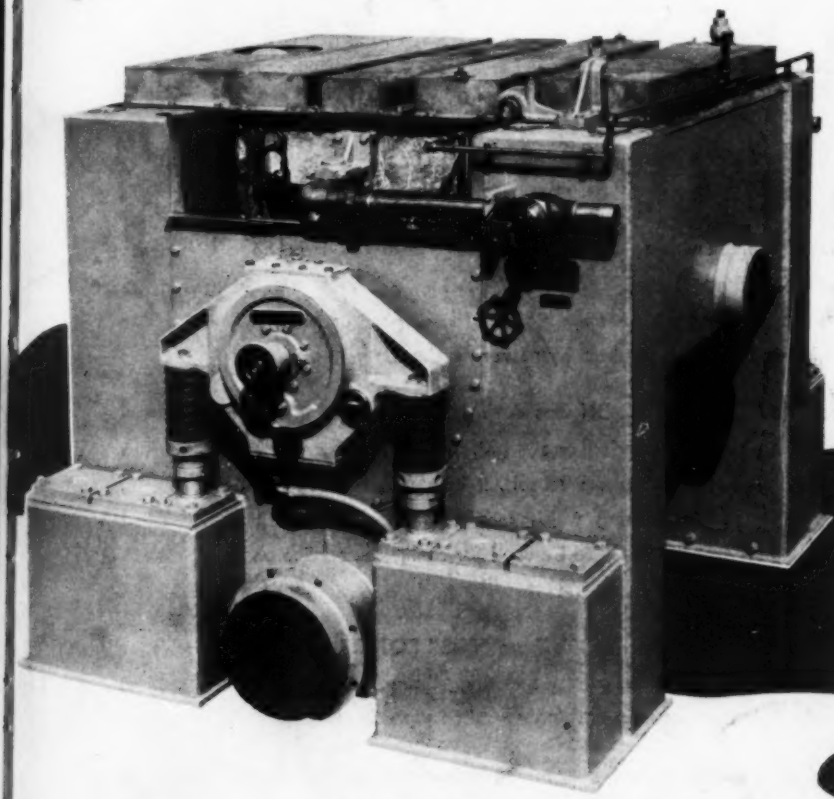

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A high-intensity type slotted-plate screen for better quality screening.

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It uses less valuable floor space, requires less power [illegible] continuously self-[illegible]ing.

[illegible] Lindblad will handle over [illegible] tons chemical pulp per [illegible] 0.014"

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Write now for the new J-100 bulletin showing how a Lindblad Screen can help make possible a compact pulp plant complete in one building.

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PAPER MACHINERY
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NASHUA, NEW HAMPSHIRE

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Give S-M-O-O-T-H sealing—1951 style

The ROTARY UNION was revolutionary in design and performance when it was first introduced 18 years ago. Since then it has kept pace with the changes in the paper industry to accommodate the higher speeds, greater pressures, and wider extremes in temperatures required by newer production methods.

This Type "FSG" ROTARY UNION was designed especially for continuous heavy-duty service on revolving drying equipment. This unit is flanged directly to the journal and revolves with the drum itself. It employs a heavy-duty, low-friction, metal-backed graphite bearing which requires no lubrication. This outstanding feature enables the Type "FSG" to be used for continuous service on high pressure and high temperature applications.

SPECIALISTS IN STEAM JOINTS FOR OVER 18 YEARS

The two-point syphon support of this Type "FSG" ROTARY UNION assures better alignment of the syphon pipe, prevents wearing-through and falling-off of syphon pipes, and eliminates excessive strain on syphon pipe threads.

The "FSG" is the most modern and most efficient connection for revolving paper mill equipment. For full information write for catalog 600A or give us the details of your sealing problem. Expert engineering service is available for consultation on special problems.

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America depends on

PAPER

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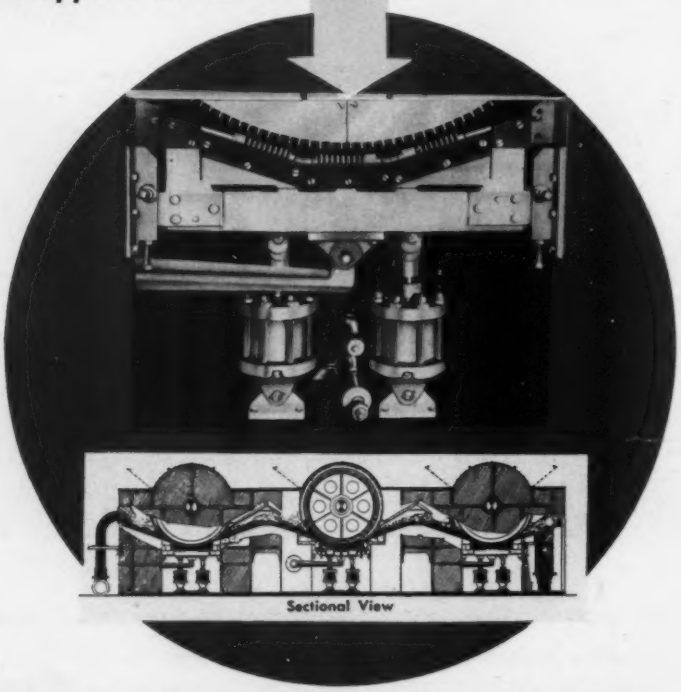
Webster and engineers agree that mechanical advantage is *"the ratio of the force which performs useful work of a machine to the force which is applied to the machine."*

EXCLUSIVE FEATURES OF THE VICTORY BEATER

1. ***Controlled Flow — uniform, positive fibrillation***
2. ***Pressurized bedplates***
3. ***Absolute control up to 40 tons bedplate pressures***
4. ***Centralized bedplates assure 100% roll-bedplate contact***
5. ***Highest effective inch cut potential***
6. ***Horizontal roll oscillation makes bars self-honing***
7. ***Lowest maintenance cost***
8. ***Tailored-to-your-plant, low-cost installation***
9. ***Spherical, anti-friction roller bearings***
10. ***1000 gallons per minute capacity***
11. ***Highest quality, high tonnage production***
12. ***All-time record for continuous production!***

VICTORY BEATERS are made in two styles: (a) Single Roll units for handling batches as small as 500 pounds. (b) Multi-Roll units with two, three, or more rolls for treating 100, 150, 200 or more tons per days on a continuous production basis.

All the facts and figures are available for your examination. For complete information, write, wire, or phone today for Booklet PI 1051.



Sectional View

To our sales department, that definition means the efficiency, economy and high production for which the *Controlled Flow* VICTORY BEATER* is famous. To you it means more and better stock refining at a lower cost . . . often the difference between profit and loss, success and failure.

*Patents issued and pending.

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Don't settle for a "cure-all" chain to handle every job. Different types of chain have different characteristics. That's why Link-Belt makes the most complete line of chains in the world. Our engineers can recommend the exact type of chain to fit your particular needs . . . the one that does your job best.

Equally important is your assurance that *any* chain with the Link-Belt name will give you longer chain life. Exact control of raw materials and processes . . . plus manufacturing refinements add up to the highest standards.

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Barked logs are conveyed from hydraulic barker to whole-log chipper rapidly and at low cost by means of Link-Belt multiple-strand chain conveyor, using Link-Belt H-124 malleable iron chain.

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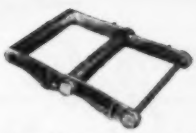
Class C combination chain—popular, durable, low cost design for elevators, conveyors.

Class SS bushed roller chain with offset sidebars—for heavy drive service at moderate speeds.



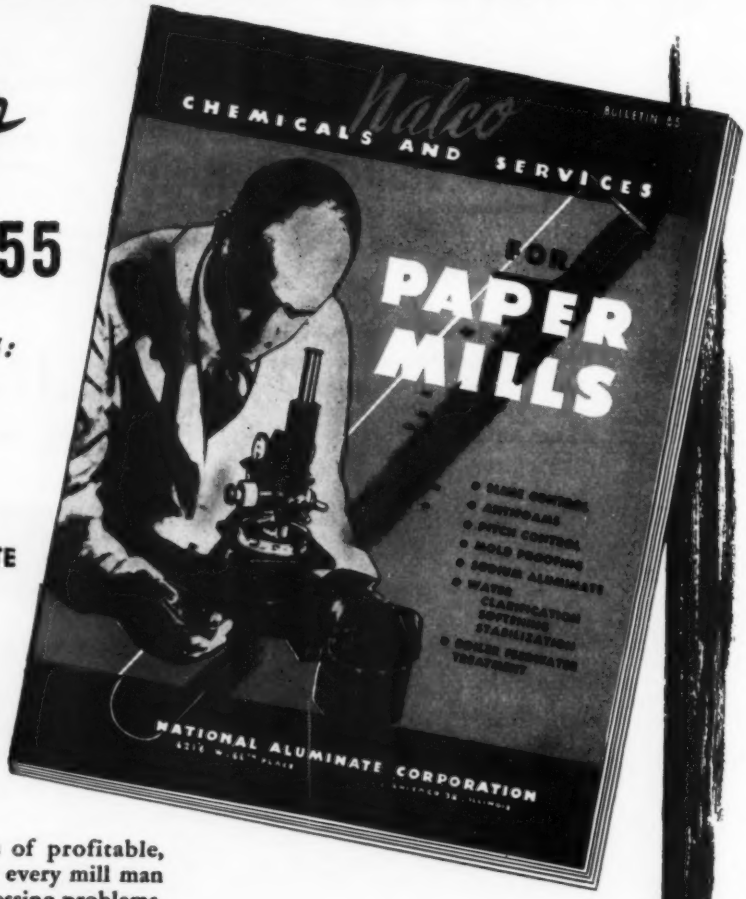
Class H drag chain—for drag conveyors, handling sawdust or other refuse in runways or troughs.

Your Copy is Ready!

Nalco BULLETIN 55

Condensed Data on:

- SLIME CONTROL
- ANTIFOAMS
- PITCH CONTROL
- MOLD PROOFING
- SODIUM ALUMINATE
- WATER
  CLARIFICATION
  SOFTENING
  STABILIZATION
- BOILER FEEDWATER TREATMENT



HERE are twenty pages of profitable, educational reading for every mill man concerned with chemical processing problems. In addition to compact information on the principal Nalco chemicals and services listed above, there are numerous photos and microphotos of typical microbiological troublemakers in mill systems . . . a big section giving detailed answers to over 75 of the most commonly asked questions about pulp and paper mill slime control . . . and factual users' reports on Nalco chemicals and services in action.

Your copy of Nalco Bulletin 55 will be sent promptly upon request. Use the coupon below, or ask your Nalco Representative.

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The Paper Industry

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VOLUME 33 • NUMBER 7 • OCTOBER, 1951

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PORTLAND: **Murray Bothwell,** 412 West Sixth Street,
Los Angeles 14, Calif., Vandike 5875.

SEATTLE 4: **Arthur G. Nietz,**
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The Sarco Draining System on No. 1 Paper Machine at Burrows Paper Corporation, Little Falls, New York.

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While there is a lot more to paper making than rapid venting and draining of dryer rolls, it is certain that you can make more paper, of better quality, at less cost, and without major investment, by installing the

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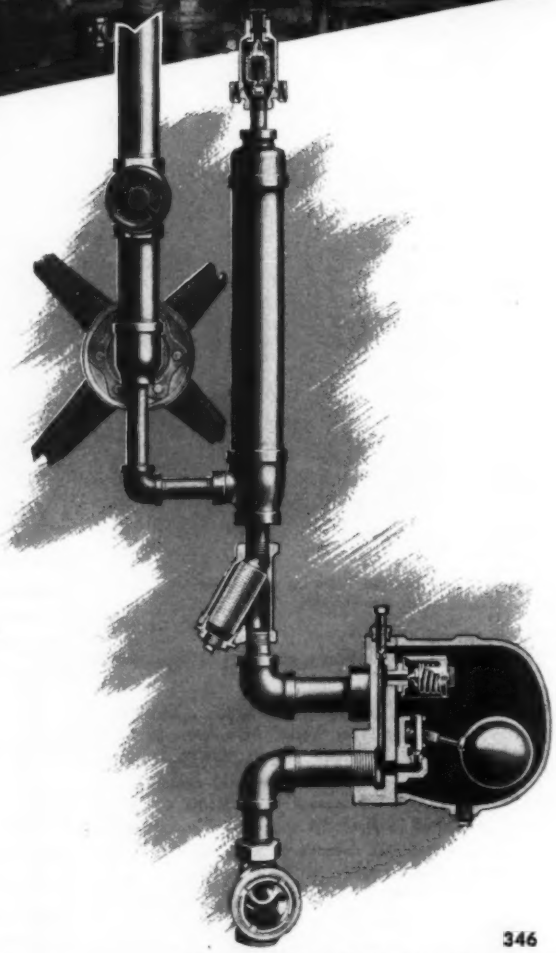
This system was first developed by our British associates, and today is in successful operation on more than a hundred paper machines all over the world. Several leading makers sell their machines Sarco equipped.

The Sarco system is applied to each individual dryer roll, making it independent of all other parts of the machine.

It can be installed on existing machines with little interruption in operation and without major piping changes.

You will find full information in Technical Bulletin 3-PI. Write for free copy today.



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Sarco Draining System for Paper Machine Dryer Rolls. Comprises high capacity thermostatic air vent on collector pipe; strainer; special float-thermostatic steam trap with steam lock release; and sight glass for observing trap in operation.

SARCO COMPANY, INC.
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A better way to wash pulps!

The use of pressure to wash pulp, instead of the vacuum or diffusion principle, has been under development for many years. Now, climaxing this research, the Pressure Washing System is offered to the industry as a commercially-proved method, applicable to both chemical and semi-chemical pulps. Here are some of the advantages it offers you:

High capacity—***300 A.D. tons per day plus***

Low power requirements

Low water consumption

Extremely flexible installation

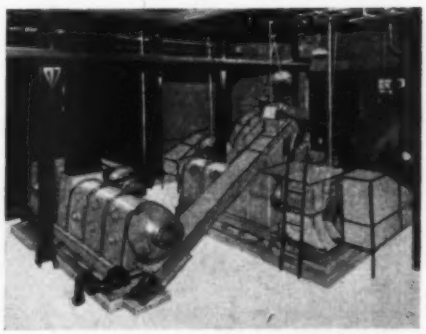
Low capital investment

Low maintenance costs

Low labor costs

No foam

Clean pulp—***to meet any specifications***



A three-stage washing installation on kraft. Pulp passes through the press on left, up inclined screw conveyer, and through press in center. Final press is shown in rear.

Last, but not least, Pressure Washing offers reduction of stream pollution and savings in evaporator costs that are unparalleled. Systems can be furnished in two, three, and four stages to fit individual mill requirements. Write for complete information on this revolutionary development.

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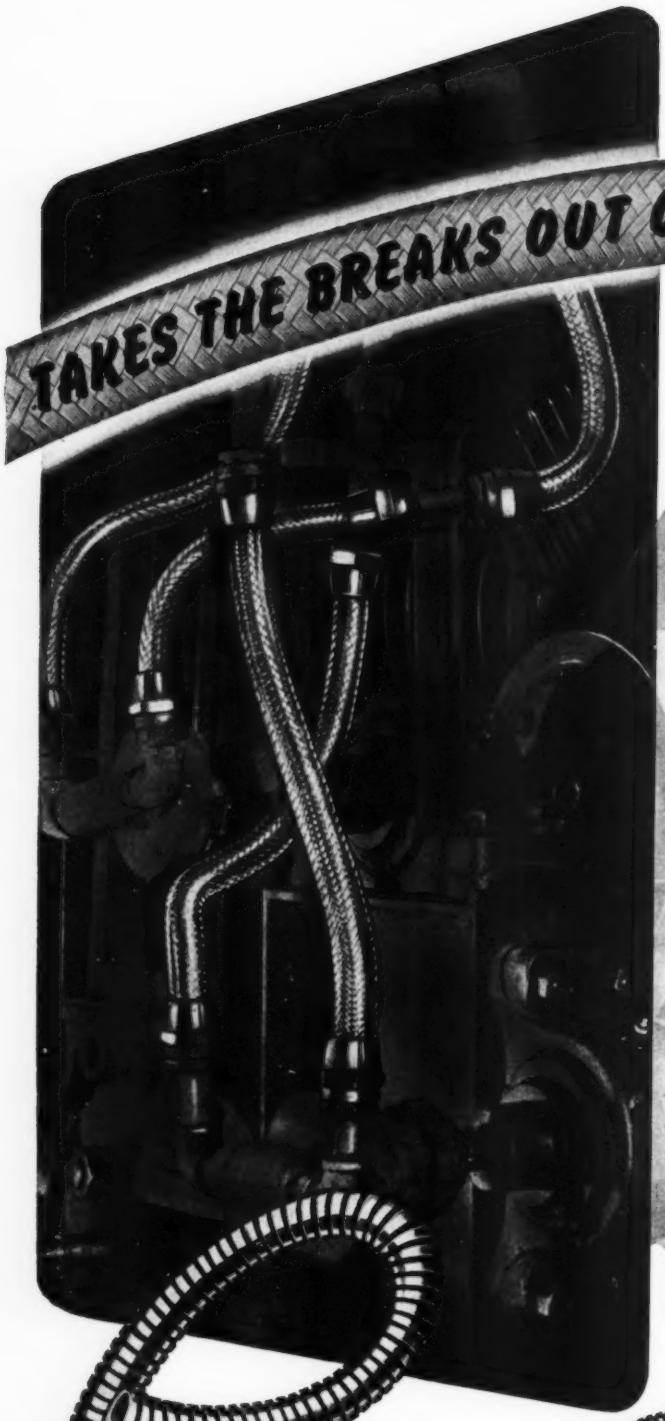

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One hundred pounds of steam fed to the spinning rollers of a paper laminating machine that was constantly moving a quarter of an inch. Rigid piping crystallized under the high frequency movement, broke and caused shutdowns. Then two years ago this large mid-west paper manufacturer called in Penflex.

The answer was one-half inch and three-quarter inch diameter braided Penflexweld, equipped with Metseal couplings. This corrugated, all metal welded tubing serves the double purpose of giving flexibility and developing super-resistance against bursting, crushing or breaking. Non-burnable Penflexweld affords complete protection against high temperatures. Vibrating motion is isolated at its source.

Penflex engineers can help you solve flexible tubing application problems. In addition to corrugated welded tubing Penflex manufactures a complete line of four-wall, interlocked tubing from 1/8" I.D. and up . . . automatic barrel fillers, accessories and fittings. Write for the new Penflex catalog that gives the latest data on the application of flexible tubing for the greatest efficiency.

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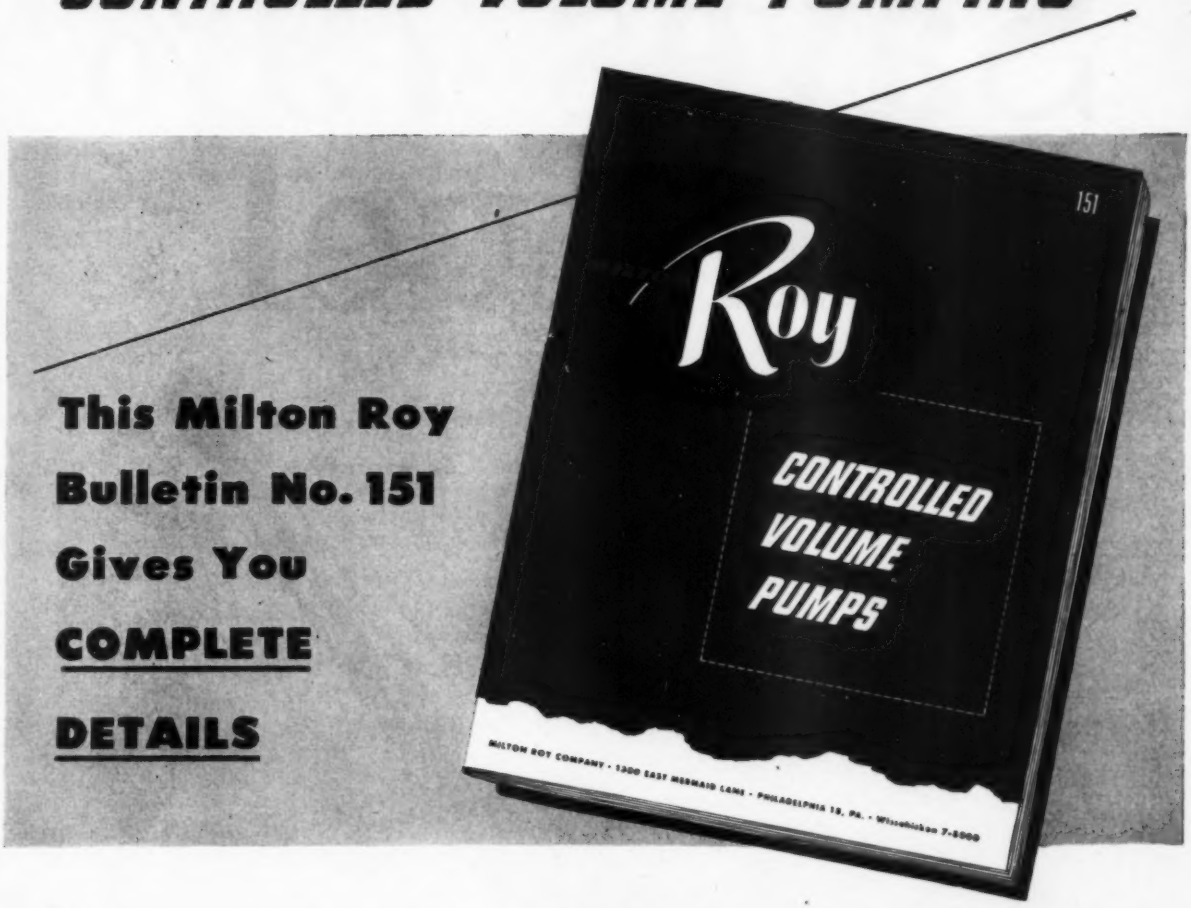
HEART OF INDUSTRY'S LIFE LINES

CONTROLLED VOLUME PUMPING



Bulletin No. 151 is filled with information on controlled volume pumping. Here are a few of the many important details you'll find in the book:

- an explanation of controlled volume pumping.
- a description of what controlled volume pumping can do for you—what it does for others in the chemical, textile, petroleum, pulp and paper, paint, food and beverage, water treatment, pharmaceutical, and brewing industries and in instrumentation, pilot plants and laboratories.
- a description of how Milton Roy Controlled Volume Pumps give users maximum benefits; how any desired rate of delivery, from zero to full capacity, can be maintained with accuracy; how deliveries as low as 3 milliliters per hour can be held with precision; how difficult-to-pump materials, such as slurries, viscous liquids, solids in suspension, etc., are readily handled.
- 4 pages of color charts which show in dramatic "traffic-light" style the relative corrosion resistance of materials of construction to over 170 chemicals. These valuable reference charts summarize industry-wide data.
- a description of the features that make Milton Roy Controlled Volume Pumps perform flawlessly on services where no other pump has filled the need.

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For your free copy of the 24-page, 2-color Milton Roy Bulletin No. 151, write or call the Milton Roy representative listed in your telephone directory. Or, if you prefer, write direct to us.

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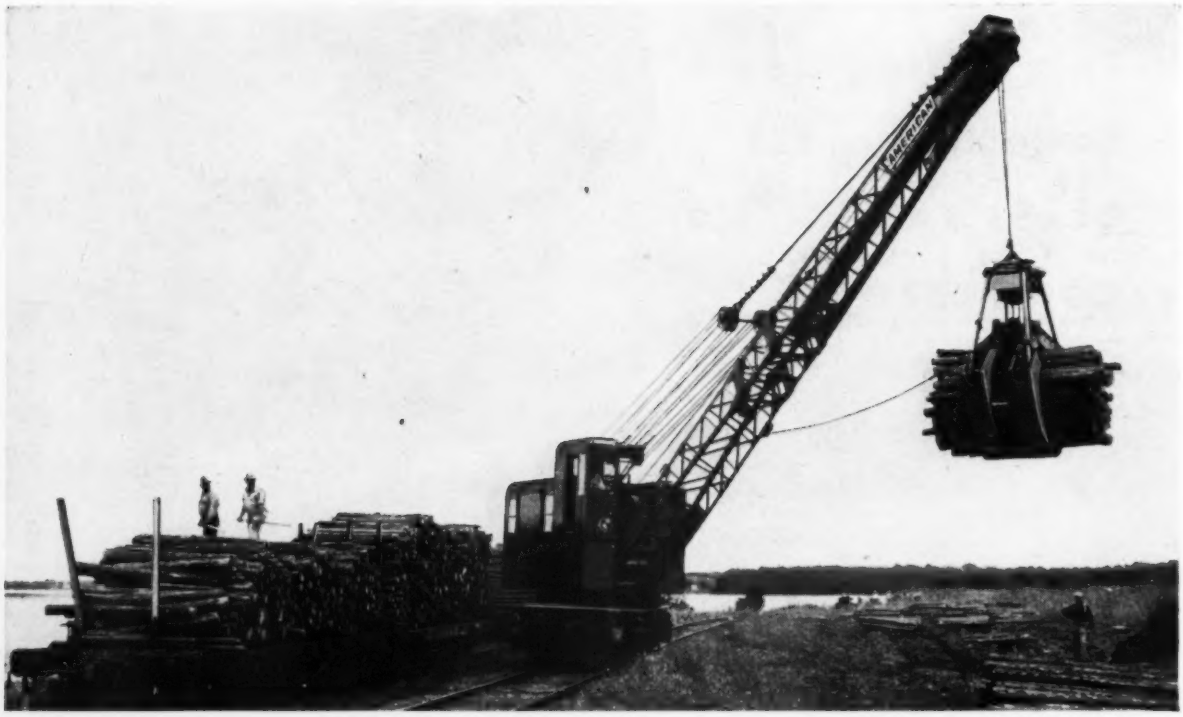

If you are still paying "extortion" money to over-age steam cranes, you will be interested in the matter of fuel costs . . . just one item of operating expense. For one crane owner, the fuel bill was cut from $6.60 a day to about $1.40 a day by replacement of a steam crane with a modern American Locomotive Crane.

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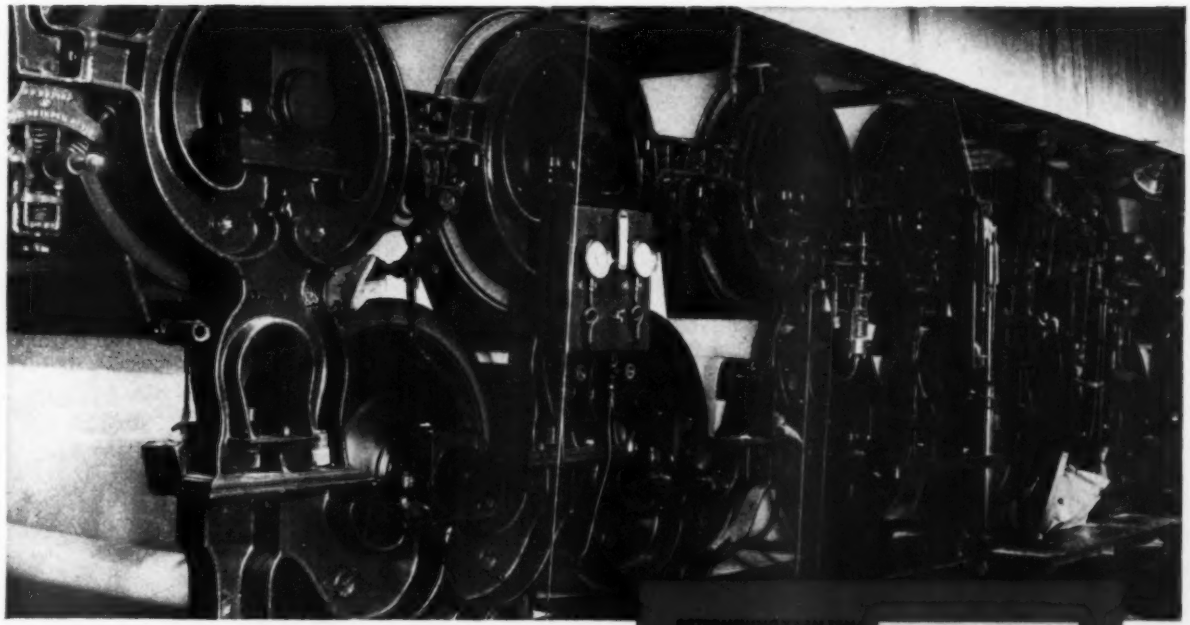

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With today's urgent need for maximum production, why take a chance on any valves that require constant attention?

By installing Powell Valves—built for perfect performance with minimum maintenance—you can stop worrying about your flow control equipment.

★ *Quality fine throughout "The Line"* ★

Gate, Check, Globe and Y Valves, in Bronze, Iron, Steel and Corrosion-Resisting Metals and Alloys

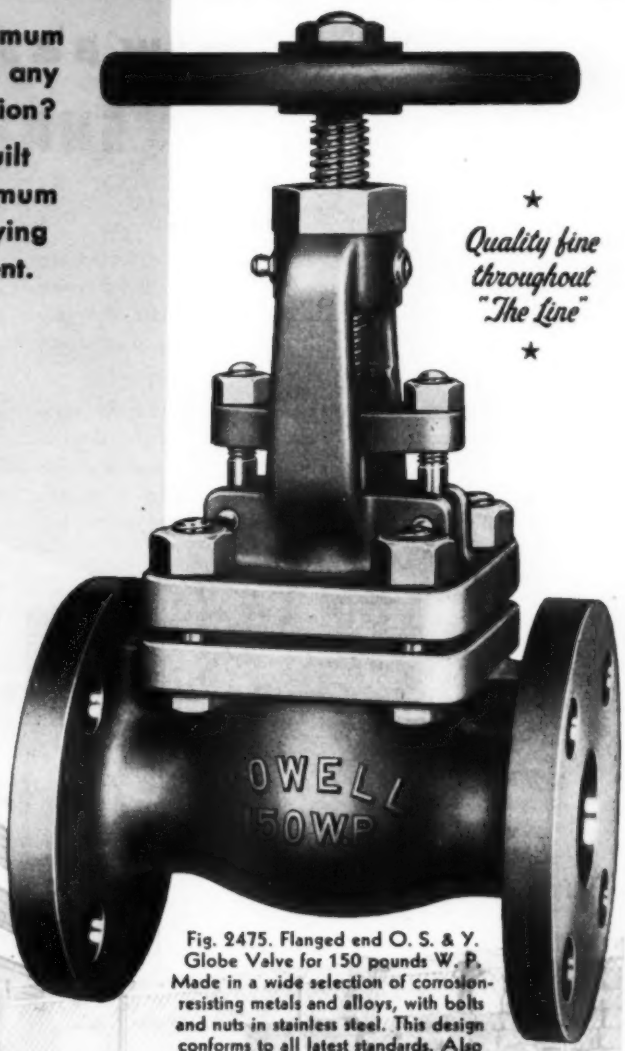

Fig. 2475. Flanged end O. S. & Y. Globe Valve for 150 pounds W. P. Made in a wide selection of corrosion-resisting metals and alloys, with bolts and nuts in stainless steel. This design conforms to all latest standards. Also available with screwed ends.

POWELL

The WM. POWELL CO., 2525 Spring Grove Ave., P. O. Box 106, Station B, Cincinnati 22, Ohio

WHEN POWELL VALVES GO IN, MAINTENANCE GOES OUT!

With today's urgent need for maximum production, why take a chance on any valves that require constant attention?

By installing Powell Valves—built for perfect performance with minimum maintenance—you can stop worrying about your flow control equipment.

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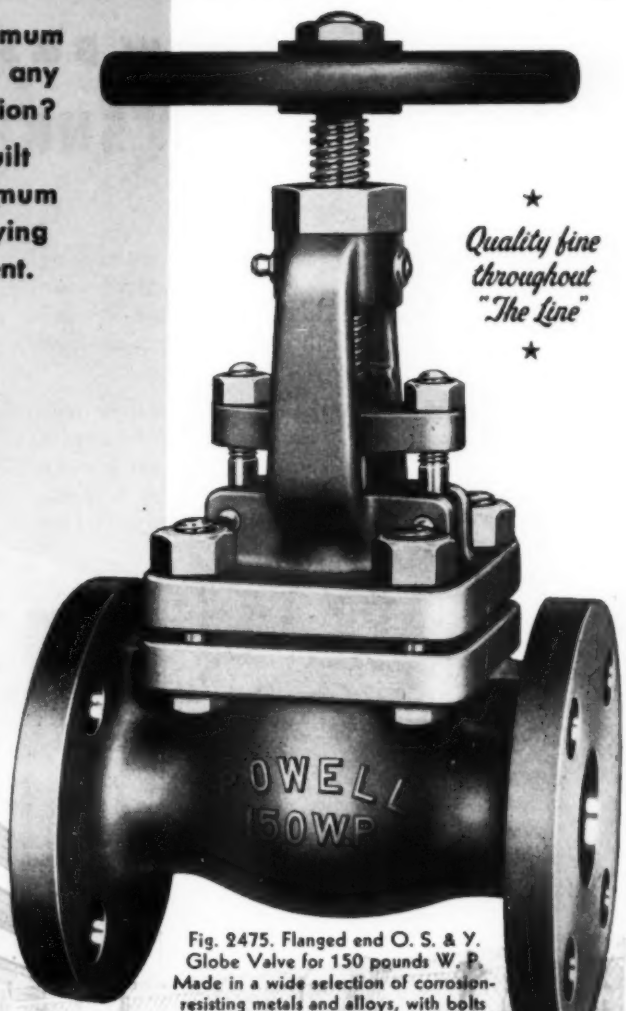
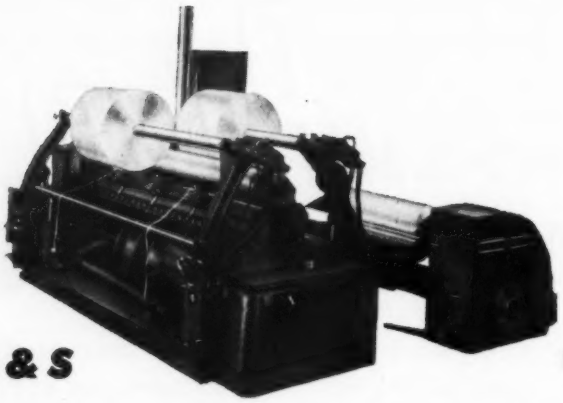


Fig. 2475. Flanged end O. S. & Y. Globe Valve for 150 pounds W. P. Made in a wide selection of corrosion-resisting metals and alloys, with bolts and nuts in stainless steel. This design conforms to all latest standards. Also available with screwed ends.

POWELL

The WM. POWELL CO., 2525 Spring Grove Ave., P. O. Box 106, Station B, Cincinnati 22, Ohio

Cut Your Downtime on mill roll changing to 1 Minute or Less



with the **NEW B&S**

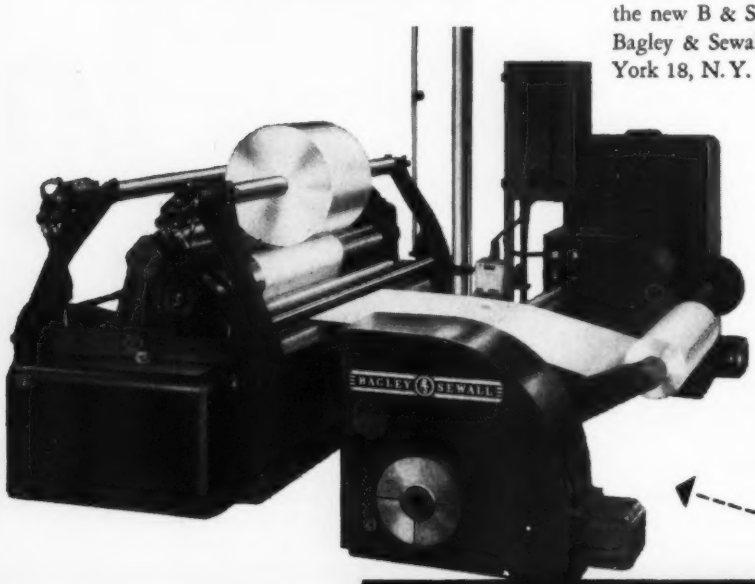
SHAFTLESS BACKSTAND

Money-consuming downtime on mill roll changing is cut to the bone by the wholly automatic B & S Shaftless Backstand. Here is what Mr. C. Carr Sherman, President of H. P. Smith Paper Co., has to say about this equipment:

"The engineering of this new unit indicates a fine understanding of the problems of the users of this type of equipment. The Backstand is much easier to handle as there are no shafts. It is also much easier and faster to make changes on it. I believe that changing rolls with this Backstand can be brought down to well under one half minute."

You may purchase the B & S Shaftless Backstand with or without the new B & S Slitter and Rewinder. The Backstand may be used on any type of rewinding equipment, as well as on waxing and laminating machinery, printing presses, etc.

For full details on the Shaftless Backstand and the new B & S Slitters and Rewinders, write to The Bagley & Sewall Company, 500 Fifth Avenue, New York 18, N.Y.



THE B & S #55 SHAFTLESS BACKSTAND features automatic tension and side register control; motor for raising and lowering mill roll arms, also motor for moving the arms to accommodate different width rolls. Entire working mechanism is totally enclosed.

designers and builders of

BAGLEY & SEWALL

WATERTOWN, NEW YORK

PAPERMAKING MACHINERY

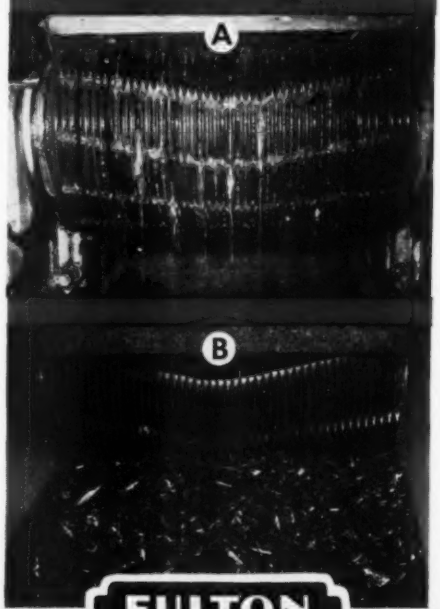
SINCE 1853

500 FIFTH AVE., NEW YORK 18, N. Y.

Foreign Representative: **CASTLE & OVERTON, INC., 630 Fifth Avenue, New York 20, N.Y.**

NOW YOU CAN CONVERT BARK INTO PROFIT WITH THE VERSATILE FULTON ROLL PRESS

Actual photographs of FULTON ROLL PRESS in operation clearly show (A) large volume of water being expressed from wet bark; (B) discharge of bark after dewatering and reduction.



de-waters and reduces mill refuse to more efficient fuel or by-product ... in one continuous, low-cost operation

With the FULTON ROLL PRESS, that pile of soggy bark, knots and screenings is quickly changed from a liability to an *asset*. This remarkable machine, perfected by the world's leading builder of sugar cane milling equipment after 99 years of experience, will:

• **DE-WATER** your bark, mill refuse and all kinds of fibrous material far more efficiently than conventional methods ... convert them into more easily-processed by-products or money-saving fuel.

• **REDUCE** your knots and screenings for redigestion or refining ... eliminating much of today's waste.

MAIL COUPON TODAY for full details and free test run of your material

Fulton Iron Works Company, *Dept. 1051*
1259 Delaware Ave., St. Louis 14, Mo.
Please send full details of FULTON ROLL PRESS
☐ We are interested in FREE test run of.....
NAME.....
FIRM.....
ADDRESS.....
CITY.....ZONE.....STATE.....

FULTON

FULTON IRON WORKS COMPANY
SAINT LOUIS 14, MISSOURI
New York Office: 82 Wall St., New York 5
MAKERS OF SUGAR PROCESSING AND EXTRACTION EQUIPMENT SINCE 1852

WHAT are the basic principles and essential features of design of a modern Cold Process Water Softener or Clarifier?

WHY is the GRAVER REACTIVATOR superior to other designs of Cold Process units?

HOW does the GRAVER REACTIVATOR operate?

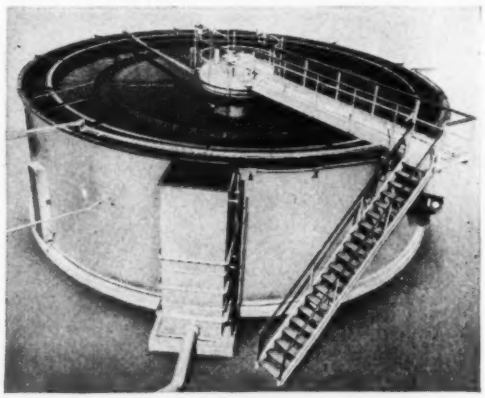
WHEN should the GRAVER REACTIVATOR be used for cold process softening or clarification?

WHERE are GRAVER REACTIVATOR installations in operation and what are the results obtained?

You will find the answers to these questions in a NEW bulletin on the GRAVER REACTIVATOR . . . a high flow rate, upflow solids-contact design of water softener and clarifier.

If your water supply is hard or contains silt, clay, color, organic impurities or other suspended solids, you will find this bulletin informative and helpful. Copies will be sent to plant executives and engineers who write on their Company letterhead.

GW-424



GRAVER

GRAVER WATER CONDITIONING CO.

Dept. 106, 216 West 14th Street, New York 11, New York, U.S.A.

A DIVISION OF GRAVER TANK & MFG. CO., INC. EAST CHICAGO, IND.

a new symbol of an old name

Rice Barton Corporation takes pleasure in introducing to you its new trademark which will henceforth appear on all Rice Barton business forms as well as on our papermaking equipment.

It is a symbol of rolls and frame, basic components of papermaking machines, and the horizontal line which represents the product — paper.

As you will appreciate, a company in its 114th year has not chosen its trademark impatiently or lightly. Heretofore, we have used as insignia only the familiar Rice Barton seal which will not be abandoned for its appropriate purposes. Primarily, however, the new insignia fulfills our need for a modern, readily identifiable symbol of Rice Barton equipment.

RB-1

RICE BARTON CORPORATION

WORCESTER, MASSACHUSETTS

Control CALIPER and WEIGHT AUTOMATICALLY

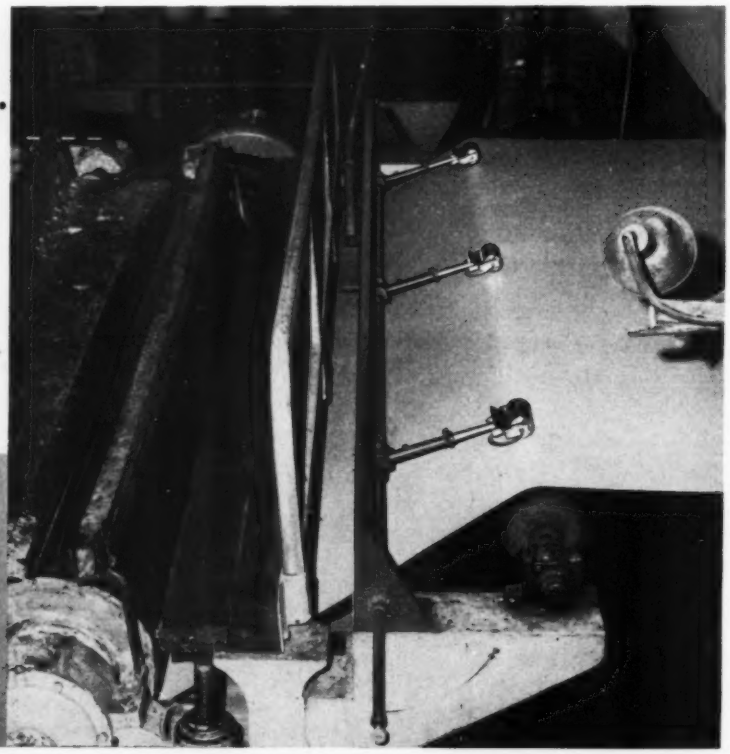
CUT COSTS • IMPROVE QUALITY • SAVE TIME • INCREASE TONNAGE

The Hurletron Automatic Caliper and Basis Weight Control will maintain density of plus or minus 3% on board within a complete range of 5 to 100 points at the dry end.

Think what that means . . . more uniform caliper . . . more uniform basis weight throughout the run . . . increased hourly production . . . a reduction in man and machine hours . . . a definite saving in stock tonnage through elimination of excess density . . . increased production through prevention of broke . . . and a more salable product due to improved quality. The Hurletron unit accomplishes all this through a unique system of controls which are automatic, positive and continuous.

- It automatically measures thickness at 40" intervals *clear across the sheet.*
- It automatically provides a continuous, permanent record of wet end caliper variations.
- It automatically makes corrections, when required, by increasing or decreasing flow from the stock flow regulator.
- It recognizes momentary oscillations and transitory signals, but corrects *only* when a *definite trend* has been established in the sheet.
- It automatically signals the operator when a drift across the sheet is indicated.
- It provides a continuous reading and record of caliper at the dry end giving a complete history of every foot of paper or board in the roll.

The Hurletron Automatic Caliper and Basis Weight Control is precision engineered and ruggedly built to withstand the punishment of round-the-clock service. Its unique advantages have been thoroughly proved by long service in a number of the country's leading mills.



WRITE FOR OUR NEW BULLETIN

Complete details about the Hurletron Control together with photographs, charts and diagrams are contained in our Bulletin No. 211. Write for your copy today. There's no obligation.

ELECTRIC EYE EQUIPMENT COMPANY
10 WEST FAIRCHILD STREET
DANVILLE, ILLINOIS

HURLETRON
Automatic
CALIPER and WEIGHT
CONTROL

It's Better than ever!

Improved Design

TYPE 2500-259
with fabricated
steel float cage...

and the little Brother and Sister

TYPE 2500-249V
for side
vessel mounting

TYPE 2500-249P
for top
vessel mounting

Accepted everywhere for

- **LIQUID LEVEL CONTROL**
- **LIQUID LEVEL INDICATION**
- **INTER FACE CONTROL**

Yes – it's preferred, because it gives peak performance. The newly designed Fisher Series 2500 Level-Trol combines many improved features to better meet every field service requirement – to provide longer life with ease of maintenance. Write today for Fisher Bulletin F-3.

FISHER®

LEVEL-TROL®

FISHER GOVERNOR COMPANY
Marshalltown, Iowa

FISHER®

WORLD LEADER IN THE MANUFACTURE OF LIQUID LEVEL CONTROLLERS, PRESSURE REGULATORS AND IN RESEARCH FOR BETTER CONTROL

. . . in other words, not "off the shelf" because many of the stock handling problems of present day mills cannot be met by the use of standardized stock pumps. Interchangeability and economical production of parts, yes, but other than that it has been our policy over the years to consider each stock pump job as a separate engineering problem.

All factors are taken into consideration and then recommendations are made only on the basis of the best pump to accomplish the work to be done. It may cost a few extra dollars but this is compensated for many times over by dependable, low cost operation in any long range evaluation.

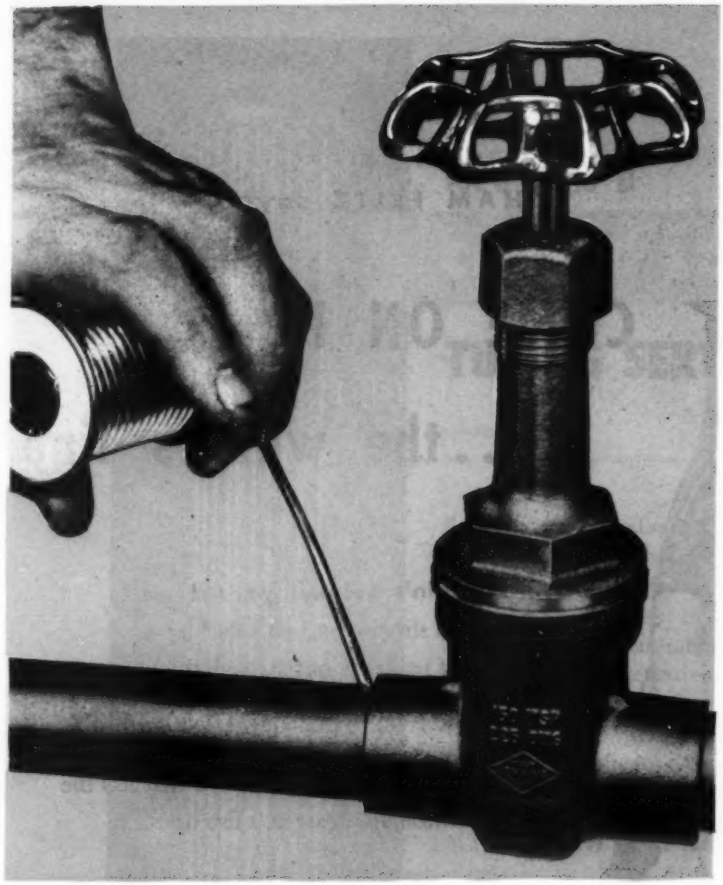
Proof that Warren engineering, design and construction meet the unqualified approval of pulp and paper mill authorities . . . proof that in actual operation, under widely diversified conditions, Warren Pumps will live up to efficiency and economy claims, is evidenced by the high percentage of repeat orders. Why don't you, too, put your stock handling problems up to Warren?

SEND FOR WARREN STOCK PUMP BULLETINS

PP-10

WARREN PUMPS

WARREN STEAM PUMP COMPANY, INC., WARREN, MASSACHUSETTS



For

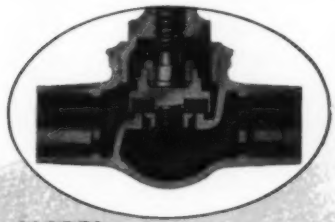
EASY INSTALLATION
POSITIVE CONTROL
LASTING ECONOMY
in copper line service

JENKINS *Solder-End* VALVES

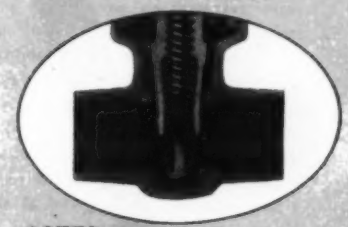
To speed installation in copper lines, you want a valve with an accurate fit to tubing—a valve that will not distort under the intense heat of soldering. And, because flexible tubing does not afford the rigid support of standard pipe, you want a valve that will withstand unusual strains in operation.

To give you Solder End Valves that meet *every* test in the toughest service Jenkins valve specialists designed them with an extra measure of rugged endurance, along with the dimensional accuracy and operating efficiency you expect in all valves of Jenkins quality.

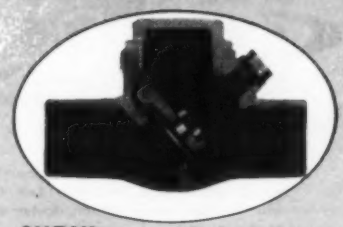
A new Folder, Form 198, describes the complete line of Jenkins Solder End Valves, shows construction details, and gives instructions for correct installation. Get your copy—see why so many economy-wise valve buyers specify *Jenkins.* Jenkins Bros., 100 Park Ave., New York 17. Jenkins Bros., Ltd., Montreal.



GLOBES 300 lbs. O.W.G. ¼" to 3"
Fitted with Jenkins Renewable Composition Disc for any specified service.



GATES 225 lbs. and 300 lbs. O.W.G. ¼" to 3" With solid or split wedges, and stationary or traveling spindles.



CHECK 300 lbs. O.W.G. ¼" to 3"
Regrinding. May be easily reground without removal from line.

GET THIS New FOLDER ON JENKINS Solder End VALVES
Gives complete description, dimensions, and instructions for installation. Ask your Jenkins Distributor or write for Form 198: Jenkins Bros., New York 17.

JENKINS VALVES
LOOK FOR THE DIAMOND MARK
SINCE 1864 TRADE JENKINS MARK

HAM FELTZ says:

COME ON IN

...the water's fine!

Wet felts ain't wet until you wet 'em. Some of 'em shed water like a duck's back 'stid of leakin' it out through the spaces between the threads.

My idee of a good wet felt is one that lets the water run through as easy as a fish net.

Naturally that means Hamilton Felts —some folks calls 'em Shuler Felts. I calls 'em durn good felts—as leaky as old shoes and as tough as the hide of an allegator.

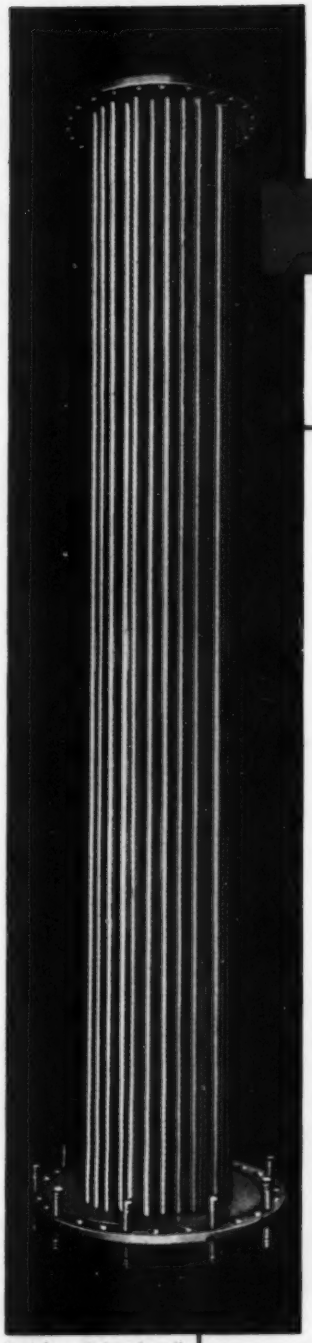
From the thinnest tissue to the heaviest board there is a Hamilton Felt that will do your work better, faster and at lower cost.

Hamilton Felts

MIAMI WOOLEN MILLS

Established 1858

SHULER & BENNINGHOFEN, HAMILTON, OHIO



B&W Stainless Tube bundle for heater in sulphite mill

let's take a CLOSER LOOK at TUBING SERVICE CONDITIONS

Because corrosive, abrasive, and temperature conditions in pulp and paper making processes range from mild to severe, matching tubes to jobs is imperative for optimum cost-life ratio.

If you are undecided as to whether you are expecting too much or too little from present tubing applications, consult Mr. Tubes—your B&W Tube Representative. Chances are he can give you valuable assistance on your requirements in the light of today's critical materials situation.

Send for Bulletin TB-328 containing properties, applications, fabricating data, and other information on these . . .

B&W SEAMLESS and WELDED TUBES for Pulp and Paper Mills

Carbon Steel—Used where service conditions are mild, that is, where the temperatures involved are relatively low and corrosive attack is not anticipated.

B&W Nicloy 3½, B&W Nicloy 5—Nickel Alloy Steels (Seamless only)—For resistance to alkaline corrosion.

B&W Croloy 18-8s (Type 304)—versatile and widely used grade. Its resistance to many kinds of corrosion, its oxidation resistance, and ease of handling, are some of the properties that make this steel an economical choice for many stainless installations.

B&W Croloy 16-13-3 (Type 316), B&W Croloy 18-13-3 (Type 317) — Extensively used because of their high corrosion-resisting properties, unusually high strength at elevated temperatures, and excellent resistance to oxidation. Type 317, having an increased chromium and molybdenum content, offers additional corrosion resistance.

B&W Croloy 18 (Type 430)—This "straight chromium" stainless steel is resistant to both corrosion and oxidation and is one of the most widely used of the ferritic grades. It is not susceptible to intergranular corrosion and is relatively free from pitting corrosion. It is particularly resistant to alkaline solutions, and is excellent in nitric acid and nitrating solutions. It is ductile and easily formed.

In addition to the grades listed above, B&W makes seamless and welded tubing in a wide range of other stainless and alloy steels.

THE BABCOCK & WILCOX TUBE COMPANY

Executive Offices: Beaver Falls, Pa.

General Offices & Plants

Beaver Falls, Pa.—Seamless Tubing; Welded Stainless Steel Tubing

Alliance, Ohio—Welded Carbon Steel Tubing

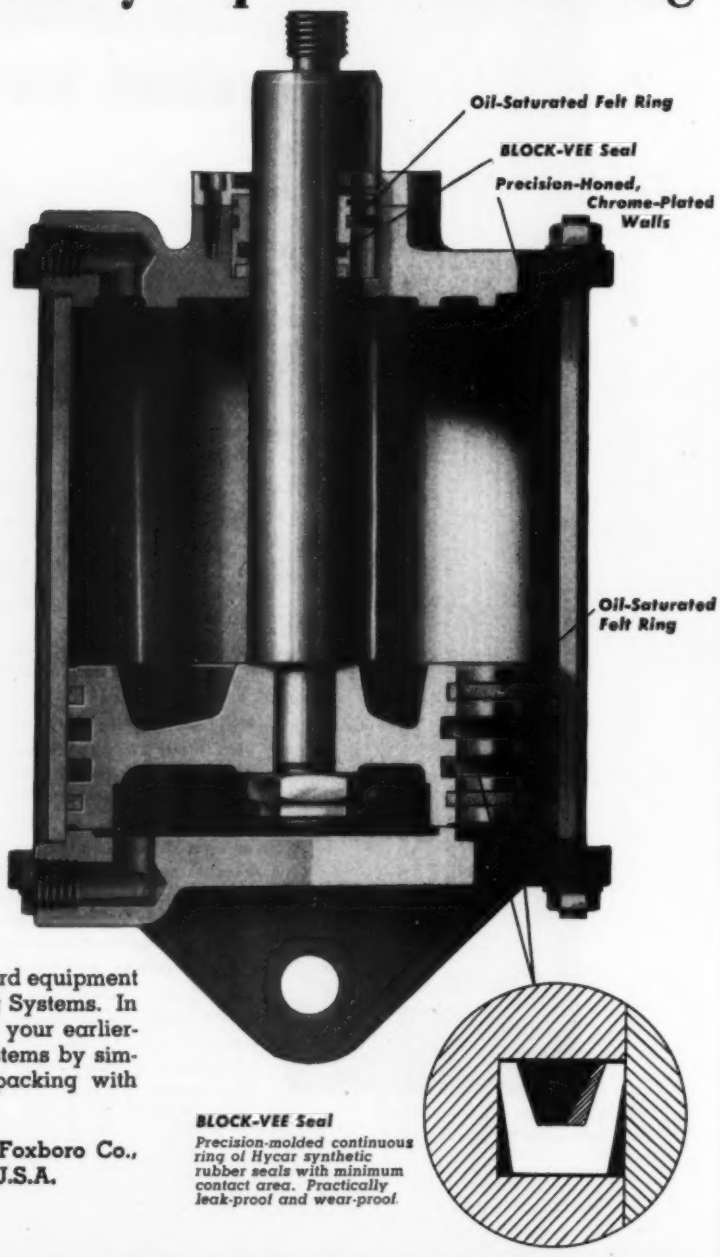
Sales Offices: Beaver Falls, Pa. • Boston 16, Mass. • Chicago 3, Ill. • Cleveland 14, Ohio • Denver 1, Colo. Detroit 26, Mich. • Houston 2, Texas • Los Angeles 17, Calif. • New York 16, N. Y. • Philadelphia 2, Pa. • St. Louis 1, Mo. • San Francisco 3, Calif. • Syracuse 2, N. Y. • Toronto, Ontario • Tulsa 3, Okla.

B&W SEAMLESS and WELDED TUBES

TA-1646-S

Now... unique Stabiload cylinder radically improves roll loading!

Ends stickiness and air leakage in pneumatic loading



Designed specifically for Foxboro Pneumatic Loading Systems, the new Foxboro STABILOAD Air Cylinder now makes possible more-accurate and more-uniform moisture extraction . . . safely permits higher nip pressure . . . than ever before could be obtained with loaded rolls.

Through use of the exclusive Block-Vee Piston Seal and precision-honed, chrome-plated cylinder wall, Stabiload Cylinders are so nearly friction-free that even fractional changes in air pressure settings give immediate, corresponding changes in roll nip pressure. You'll get substantial savings in maintenance because the Block-Vee Seal never needs attention or adjustment. And the virtual elimination of air-leakage gives substantial savings in compressed air.

STABILOAD Air Cylinders are standard equipment on all new Foxboro Pneumatic Loading Systems. In addition, you can importantly improve your earlier-model Foxboro Pneumatic Loading Systems by simple replacement of piston, rod and packing with STABILOAD components.

Write for detailed Bulletin 446. **The Foxboro Co., 15810 Neponset Ave., Foxboro, Mass., U.S.A.**

BLOCK-VEE Seal

Precision-molded continuous ring of Hycar synthetic rubber seals with minimum contact area. Practically leak-proof and wear-proof.

FOXBORO
REG. U. S. PAT. OFF.

PNEUMATIC ROLL-LOADING

FACTORIES IN THE UNITED STATES, CANADA AND ENGLAND

HORTON

STAINLESS CLAD DIGESTERS FOR WESTERN EUROPE

THE two Horton stainless clad digesters in the above view are 11 ft. 10 in. in diam. by 37 ft. 11½ in. high. They are shown loaded on cars at our Birmingham plant ready for shipment to a new European pulp mill.

These digesters and many other Horton steel plate structures such as diffusers—accumulators—Marx Savealls—pulp washing tanks—and settling tanks, are providing the world's pulp and paper industry with new operating economies.

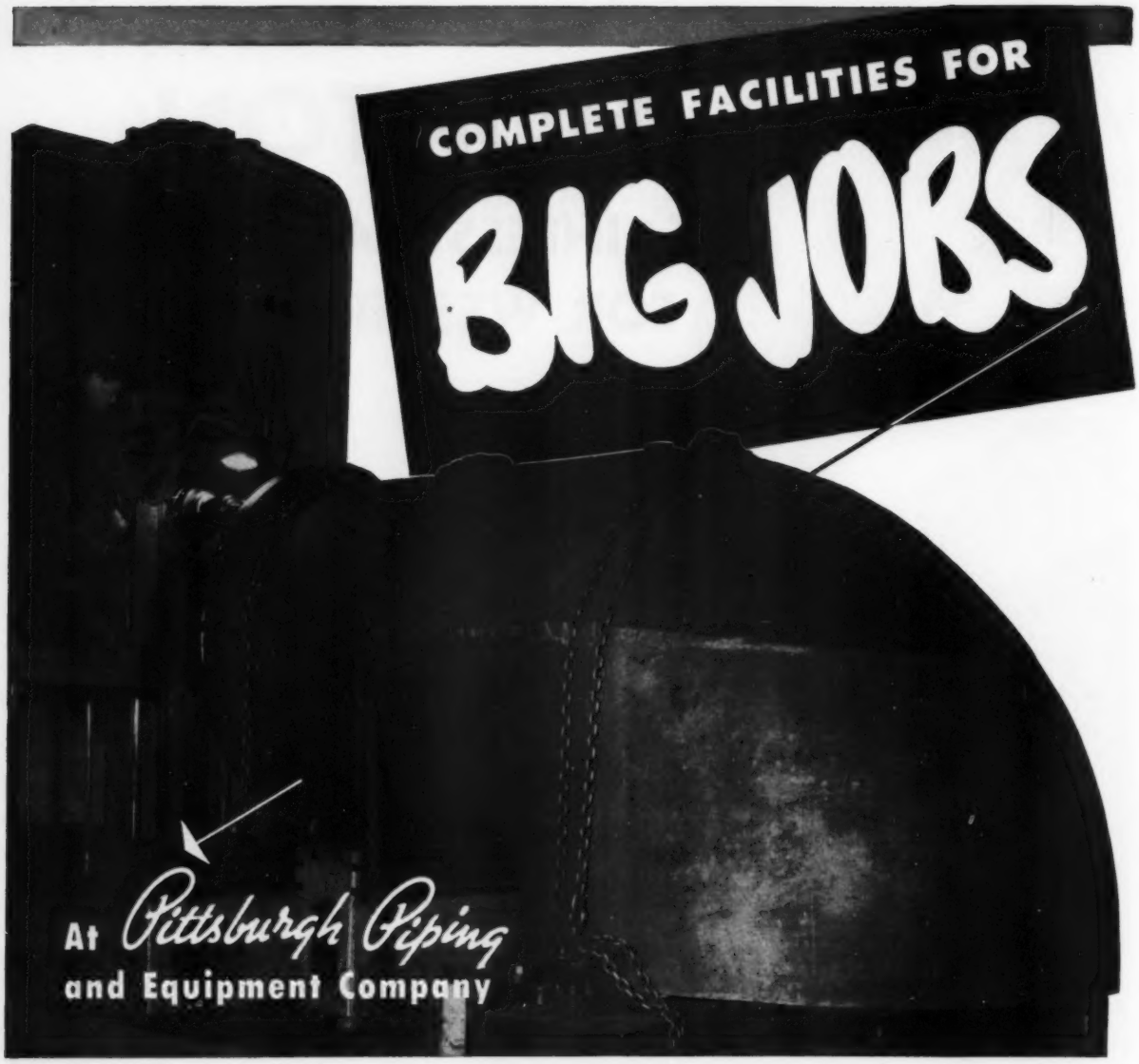
Our design, fabrication and erection facilities are complete. We build steel plate structures from carbon steel, solid or clad non-corrosive metals, or put corrosion resistant linings in carbon steel installations when mill conditions require it. We have equipment for x-raying and stress relieving, and recently we have increased our facilities for pickling and painting by the Phoscote Process. This process is a proven method of increasing the life of Horton steel plate structures by removing mill scale and improving the bond between the metal and the paint.

If you are modernizing your existing facilities or building an entirely new plant, write our nearest office for information or quotations on steel digesters, tanks and other steel plate structures.

CHICAGO BRIDGE & IRON COMPANY

Atlanta, 3.....2143 Healey Building
Birmingham, 1.....1511 North 50th Street
Boston, 10.....1026—201 Devonshire Street
Chicago, 4.....2445 McCormick Building
Cleveland, 15.....2267 Guildhall Building
Detroit, 26.....1566 Lafayette Building
Houston, 2.....2143 National Standard Building
Los Angeles, 17....1559 General Petroleum Building
New York, 6.....3350—165 Broadway Building
Philadelphia, 3....1653—1700 Walnut Street Building
Salt Lake City, 4.....527 West 17th South Street
San Francisco, 4.....1547—200 Bush Street
Seattle, 1.....1327 Henry Building
Tulsa, 3.....1651 Hunt Building
Washington 6, D. C.....1138 Cafritz Building

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA. In Canada: HORTON STEEL WORKS, Limited, FORT ERIE, ONT.



Machining a casting of this size requires special equipment—big equipment for handling big jobs.

Actually, this casting is small compared to the complex piping systems that are planned, prefabricated, and tested *under one roof* at Pittsburgh Piping and Equipment Company.

At P.P.& E. all facilities are integrated . . . engineering, metallurgical and mechanical laboratories, bending, Van Stoning, machining, heat-treating, stress-relieving, testing.

Because our manufacturing personnel and equipment are all under the roof of one great plant—our complete know-how, experience, and facilities are constantly available on every job.

This is another reason why you can depend upon Pittsburgh Piping and Equipment Company for service that provides greatest safety, highest efficiency, and longest life from high temperature, high pressure piping.

Pittsburgh Piping
AND EQUIPMENT COMPANY
10 Forty-Third Street—Pittsburgh, Penna.

Woolworth Building, New York
Whitehead Building, Atlanta
Book Tower, Detroit
321 Market Street, San Francisco
Peoples Gas Building, Chicago
Public Square Building, Cleveland
10 High Street, Boston
Heights State Bank Bldg., Houston

APPLETON FELTS

for

UNIFORMITY,

DEPENDABILITY,

SERVICE, DESIGN

***and* FINISH-**

Appleton
WOOLEN MILLS
APPLETON • WIS.

The Line of Most Resistance

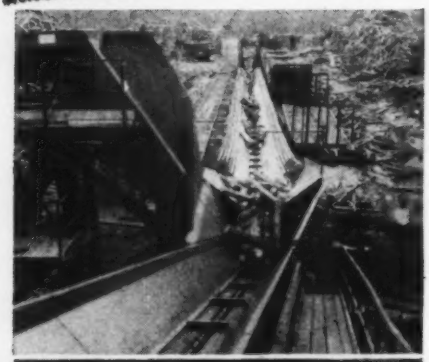
REX Pulp Mill Chains

Maximum wear resistance and the *ultimate* in *shock resistance* are built-in features of all Rex Pulp Mill Chains. These quality chains are designed for dependability . . . for long-lasting service under every type of operating condition. Right through the mill, there's a Rex Chain that's right for every operation from log haul to the digesters.

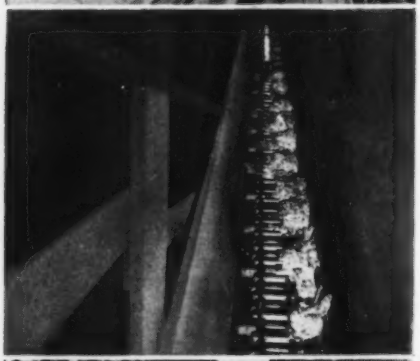
With standard Rex Chains, you can forget about production hold-ups due to drive or conveyor failures. Rex Chains keep going under loads and operating conditions where ordinary chains would quickly fail.

For complete information and selection assistance, call your Rex Field Office or write direct to Chain Belt Company, 1714 West Bruce Street, Milwaukee 4, Wis., for your copy of Catalog 48-27.

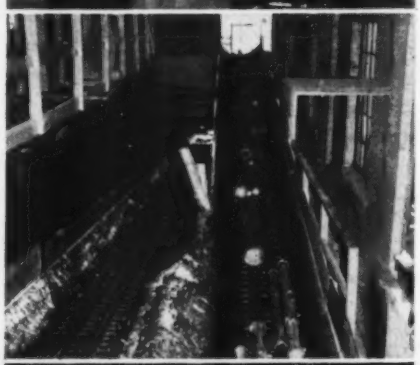
(49-106)



This wood yard conveyor uses husky Rex Mill Refuse and Log Chains. Designed with alternating cast block links and steel side bar links, these chains provide a large sliding surface and maximum bearing area.



Rex H-Type Conveyor Chains are used in this refuse conveyor. Operating in shallow troughs, these chains with their great width assure large capacity at low speeds. Wide wearing shoes, reinforced barrel faces and vertical lugs on the side bars provide extra wear resistance.



One of the most popular chains in the wood room is husky Rex Combination. Inside block links of malleable iron or Rex Z-Metal and high carbon steel side bars assure plenty of wear-resistance. Chain links can be turned over when wear does take place, assuring double life.

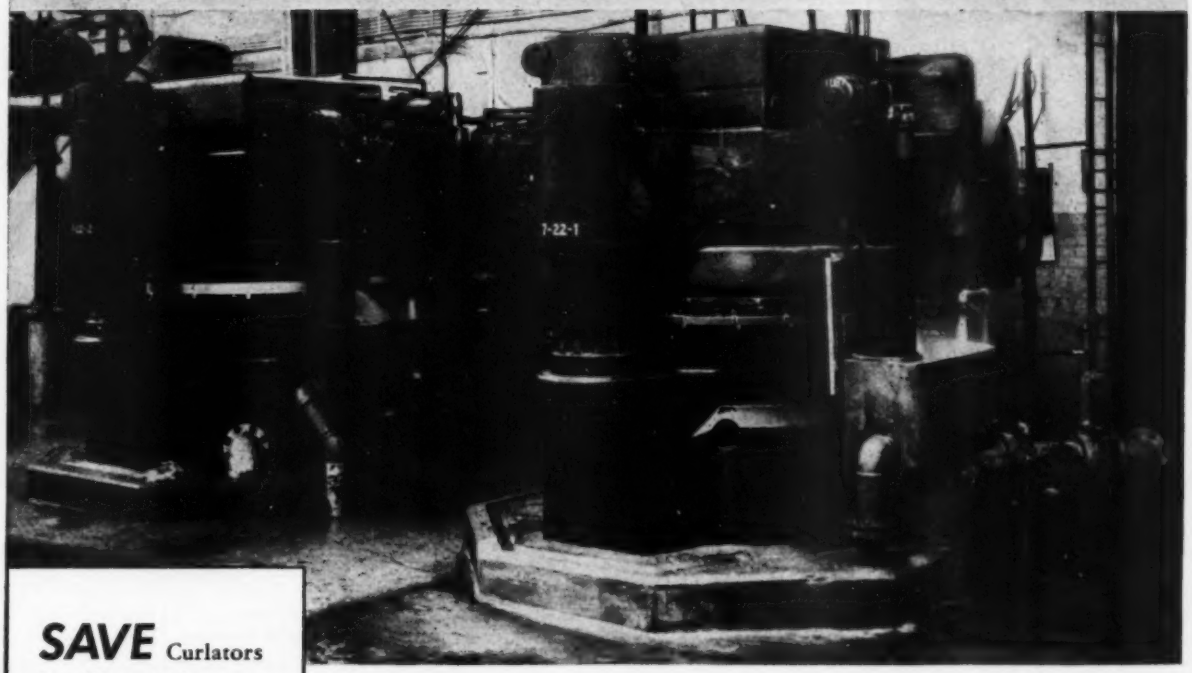
Plenty of drive for the barking drum is assured by sturdy Rex Chabelco Steel Chain. Combining relatively light weight with high strength, it withstands the severe vibration and shocks . . . lasts longer.

CHAIN BELT COMPANY — REX — DRIVE AND CONVEYOR CHAINS

FIRST FOR LASTING SERVICE

now available from stock

CURLATION CAN SOLVE THESE PROBLEMS!

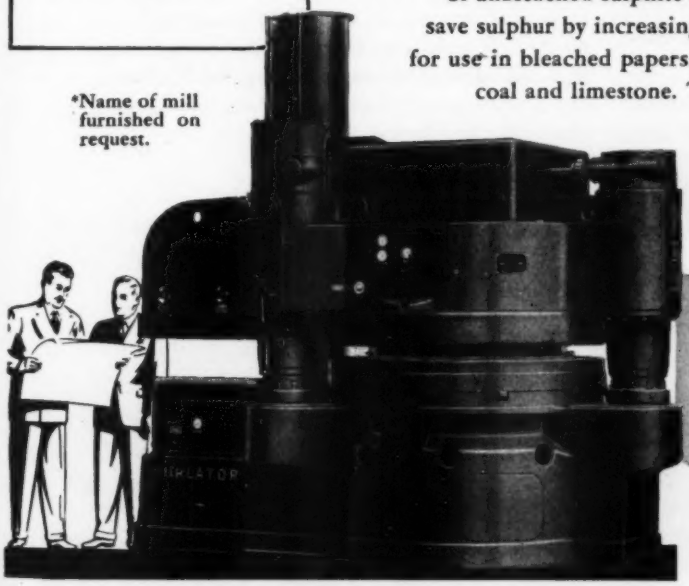


SAVE Curlators in mill operations are making substantial savings in sulphur, pulpwood, coal, and limestone.

These CURLATORS are saving this mill* more than 10% of sulphur, pulpwood, coal and limestone.

By *Curlation* you too may save 10% of your sulphur in the manufacture of unbleached sulphite for use in unbleached papers. You can also save sulphur by increasing the net yield, of unbleached sulphite pulp for use in bleached papers. In addition *Curlation* will save pulpwood, coal and limestone. These savings will not only lower costs but help conserve scarce materials.

*Name of mill furnished on request.



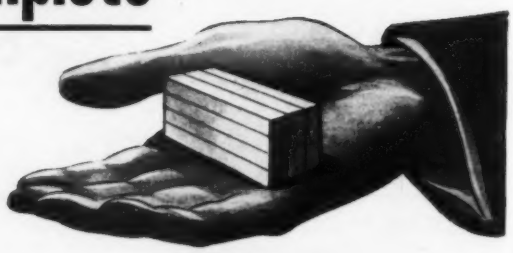
WRITE today and find out for yourself, without obligation, what a Curlator can do for you.

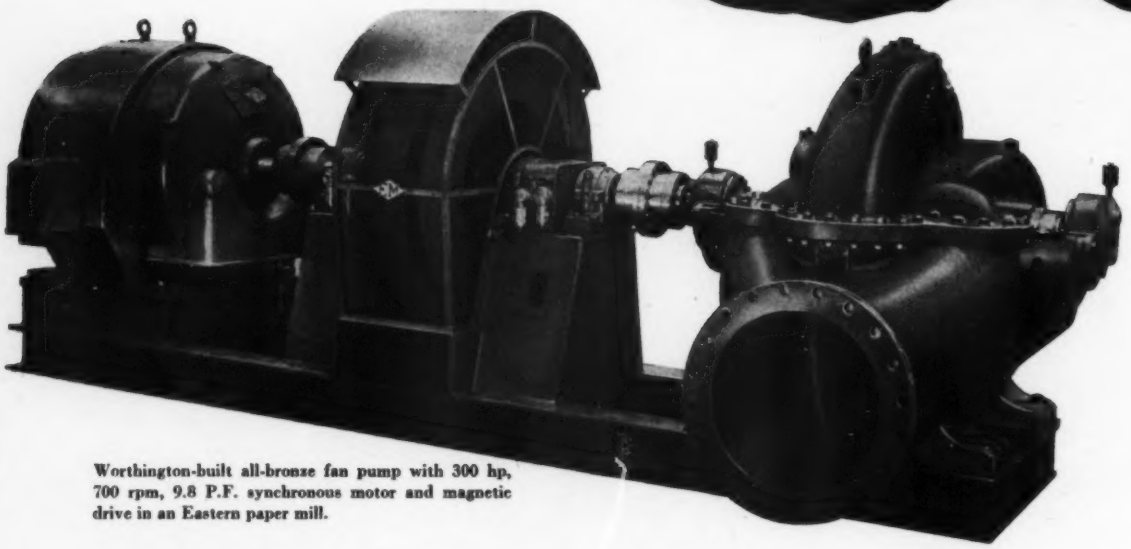
CURLATOR† *Corporation*

565 BLOSSOM ROAD · ROCHESTER 10, NEW YORK

†T. M. Reg.—Curlator Corporation, Rochester, N. Y.

Not just a pump... a complete fan pump PACKAGE





Worthington-built all-bronze fan pump with 300 hp, 700 rpm, 9.8 P.F. synchronous motor and magnetic drive in an Eastern paper mill.

You get *more* when you have your fan pump requirements filled by Worthington because:

1. A specialized pump application division set up *exclusively* for the paper industry is put at your service.

2. The unequalled experience of Worthington engineers (we're the world's largest manufacturer of pumps) gives you the benefit of the very latest engineering.

3. Your pump will be built exactly to your particular requirements.

4. The pump, the motor and variable speed drive (magnetic) are integrated into a single unit matched to your job.

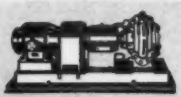
So . . . for proper matching of drive and load, lowest cost of power, and complete assurance of an accurate flow to the head box regardless of conditions encountered, turn the job over to Worthington.

As well as fan pumps up to 50,000 gpm, we make a complete range of special pumps for the paper industry. Whatever your pumping problem—send your maximum and minimum requirements to Worthington because *there's more worth in Worthington*. Worthington Pump and Machinery Corporation, Centrifugal Pump Division, Harrison, New Jersey.

WORTHINGTON

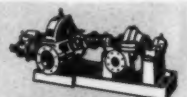
C.I.8

THE WORLD'S BROADEST LINE ASSURES YOU THE RIGHT PUMP FOR EVERY JOB



CENTRIFUGAL STOCK PUMPS
Type FP. Handle all kinds of stock up to 7% consistency. 4 sizes. Capacities up to 6000 gpm; heads up to 200 ft.

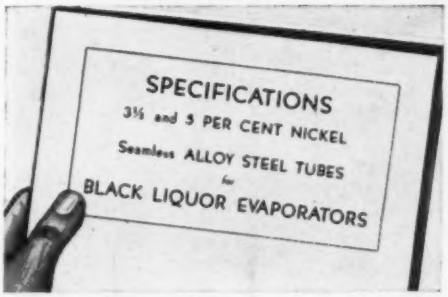
GENERAL PURPOSE PUMPS
Type DN. Single stage. Sizes 1 in. to 6 in. Capacities up to 2400 gpm; heads to 390 ft.



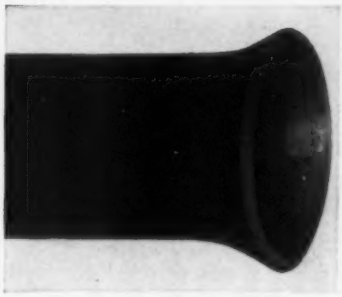
BOILER FEED PUMPS
Capacities up to 2000 gpm; pressures to 1230 psi.

Don't guess about evaporator tubes!

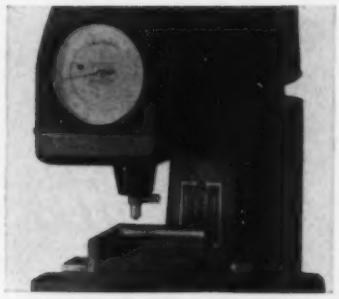
TIMKEN® shows you what you get



Specifications for Timken® 3½% and 5% nickel evaporator tubes tell you everything you want to know about the tubes you're buying. Typical points covered include the following:

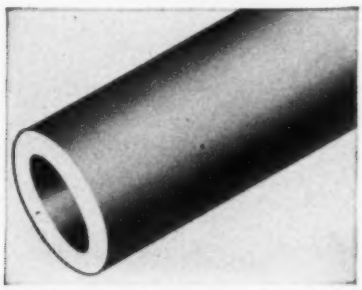


In flaring test, seamless tubing I. D. must withstand being expanded 20% over a tapered mandrel without cracking or showing flaws.

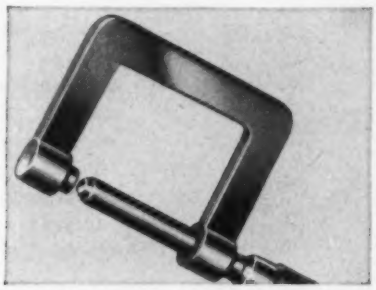


In Rockwell hardness test, made on a speciman cut from the tube, tubes must have Rockwell hardness number not exceeding B89.

Each Timken evaporator tube is tested at the mill under hydrostatic pressure of 1000 p.s.i. before shipment to the customer.



Tubes must be free from physical defects and free from scale. Finish of tubes must be workmanlike. Inspection is rigid.



Dimensional variations in outside diameter, wall thickness, and cut length, shall not exceed close allowable tolerances.

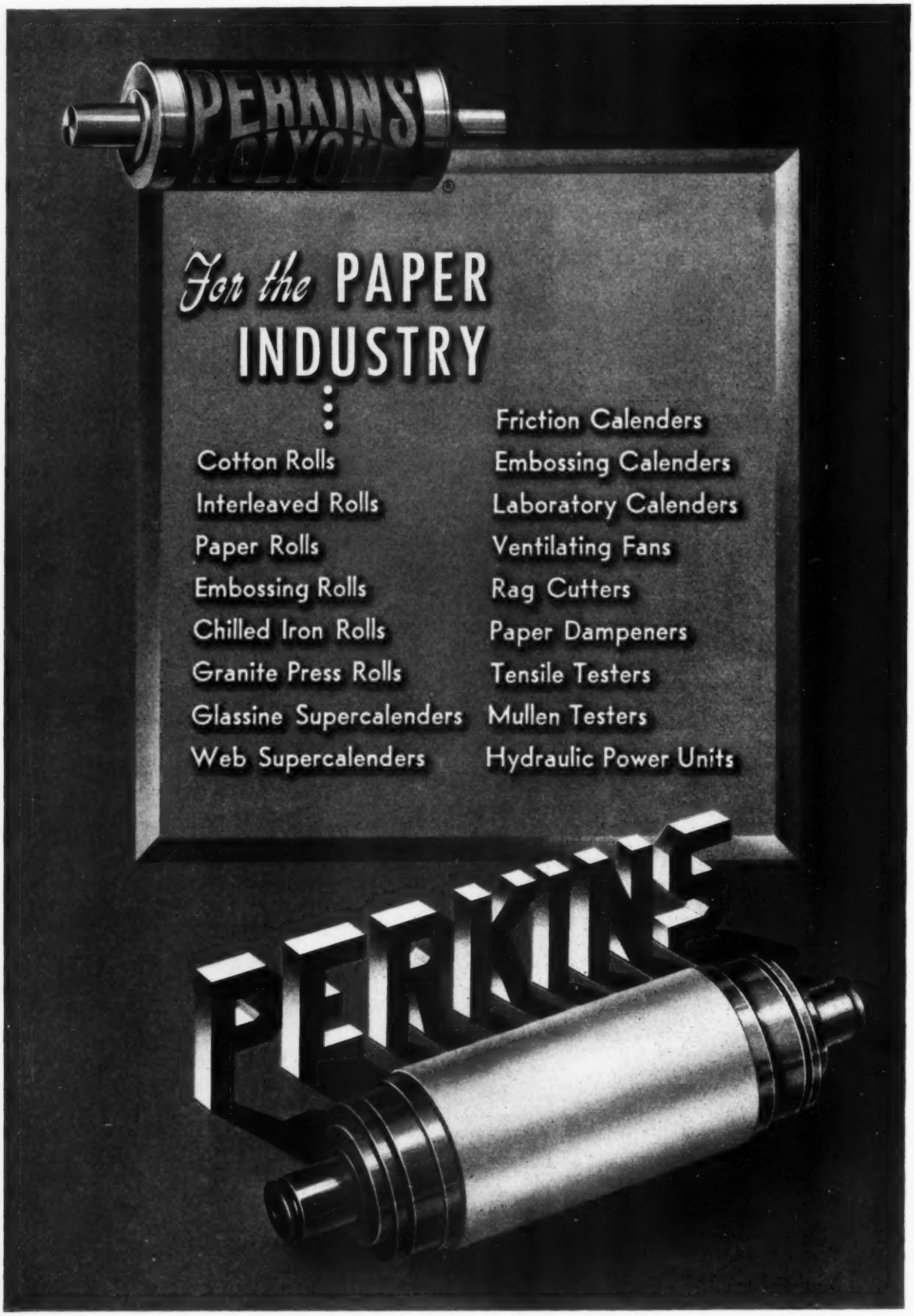
. . . and guarantees you'll get it!

NO need for guesswork when you buy black liquor evaporator tubes. Specifications published by the Timken Company for 3½% and 5% nickel tubes cover every essential point. They're available to you without obligation.

And the Timken Company guarantees that every lot of tubes will meet these specifications. Quality is controlled at every step. Tubes are tested and inspected before shipment. As a result, you have lower tube replacement costs, less tube sheet wear, reduced downtime. Write on your company letterhead for 3½% and 5% nickel tube specifications. The Timken Roller Bearing Company, Steel and Tube Div., Canton 6, O. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing.


PERKINS
POLYCOIL
For the PAPER INDUSTRY
Cotton Rolls
Interleaved Rolls
Paper Rolls
Embossing Rolls
Chilled Iron Rolls
Granite Press Rolls
Glassine Supercalenders
Web Supercalenders
Friction Calenders
Embossing Calenders
Laboratory Calenders
Ventilating Fans
Rag Cutters
Paper Dampeners
Tensile Testers
Mullen Testers
Hydraulic Power Units
PERKINS

R-S valvEvents

• EXCERPTS FROM THE R-S BOOK OF EXPERIENCE •

RUGGED Simplicity

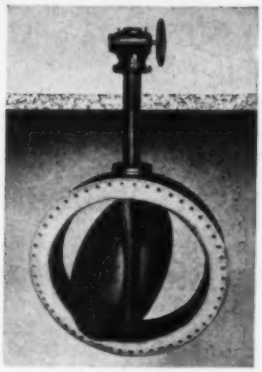
Correctly engineered mechanically and metallurgically, all body assemblies of R-S Valves equal or exceed A. S. A. standards in every detail. These valves are designed and constructed for rugged service and provided with such safety factors that they will exceed service expectations as well as reduce pumping and blower costs.

Consider also the few working parts, greater control rangeability, the self-cleaning feature and the fact that R-S Valves are readily adapted to automatic operation. Know the rugged simplicity of R-S Valves, and get the most from your valve investment.

District offices are listed in telephone directories as, "R-S Products Corp'n Valves".

R-S PRODUCTS CORPORATION
4600 Germantown Avenue, Philadelphia 44, Pa.
An S. Morgan Smith Company Subsidiary

R-S VALVES
Simplify the Control and Shut-off of Volume and Pressure from 2 to 2500 psig
Write for Catalogs 17 and 18



No. 739-740—Sixty-inch, 50-pound Heavy Duty Valve with gear reduction drive and handwheel for handling water at 40 psig. Vertical valve stem enclosed in steel pipe support. Thrust bearing absorbs vertical load.

No. 730—R-S Heavy Duty Floor Stand for rugged service in connection with any standard R-S handwheel operated valve.

No. 767—A 3-Way Valve (Two 24-inch 125-pound Cast Iron Valves bolted to 125-pound American Standard Tee). Electric motor operated by cross linkage. Automatic declutching handwheel for emergency operation.

Garlock
"Chevron" Seal

Wherever leakless operation is required—specify GARLOCK Mechanical Seals

When leakless operation of centrifugal or rotary pumps is required—particularly, if corrosive or inflammable liquids are being handled—GARLOCK Mechanical Seals will do the job.

These seals are composed of two main elements; one rotates with the shaft and the other is stationary. Since the stationary element does not contact the shaft, there is *no* wear on the shaft. A positive contact between carefully lapped metal-to-carbon or, metal-to-metal mating surfaces provides the leakless seal.

Users of GARLOCK Mechanical Seals have reported outstanding service records on a wide variety of applications. Here are just two taken from the many in our files:

- Over 3 years' service and still in operation, on a 1¾" shaft of a boiler feed pump handling water at 220°F. and 200 p.s.i., and operating at 3600 r.p.m.
- Two years' service, and still in operation, on a 1" shaft of a pump handling paint at 130°F., 10' Hd., operating at 1750 r.p.m.

GARLOCK manufactures mechanical seals in many standard and special designs from a wide range of high quality materials. For more information, write for our Mechanical Seal booklet or call your GARLOCK representative.

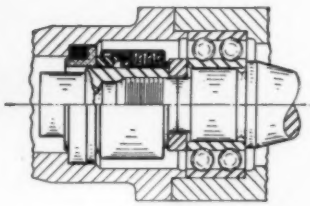
THE GARLOCK PACKING COMPANY
PALMYRA, NEW YORK

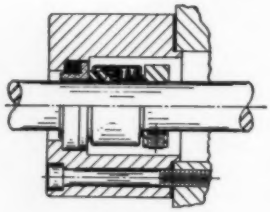
In Canada: The Garlock Packing Company of Canada Ltd., Toronto, Ont.

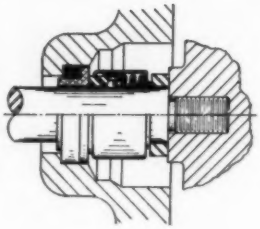
GARLOCK

TYPICAL APPLICATIONS of GARLOCK Mechanical Seals for Rotary Shafts

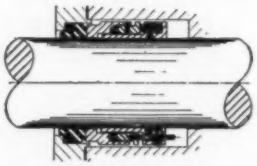
PACKAGE SEALS





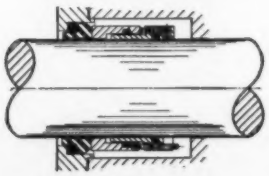


CHEVRON-TYPE SEALS



Type CB—Balanced "Chevron" Seal

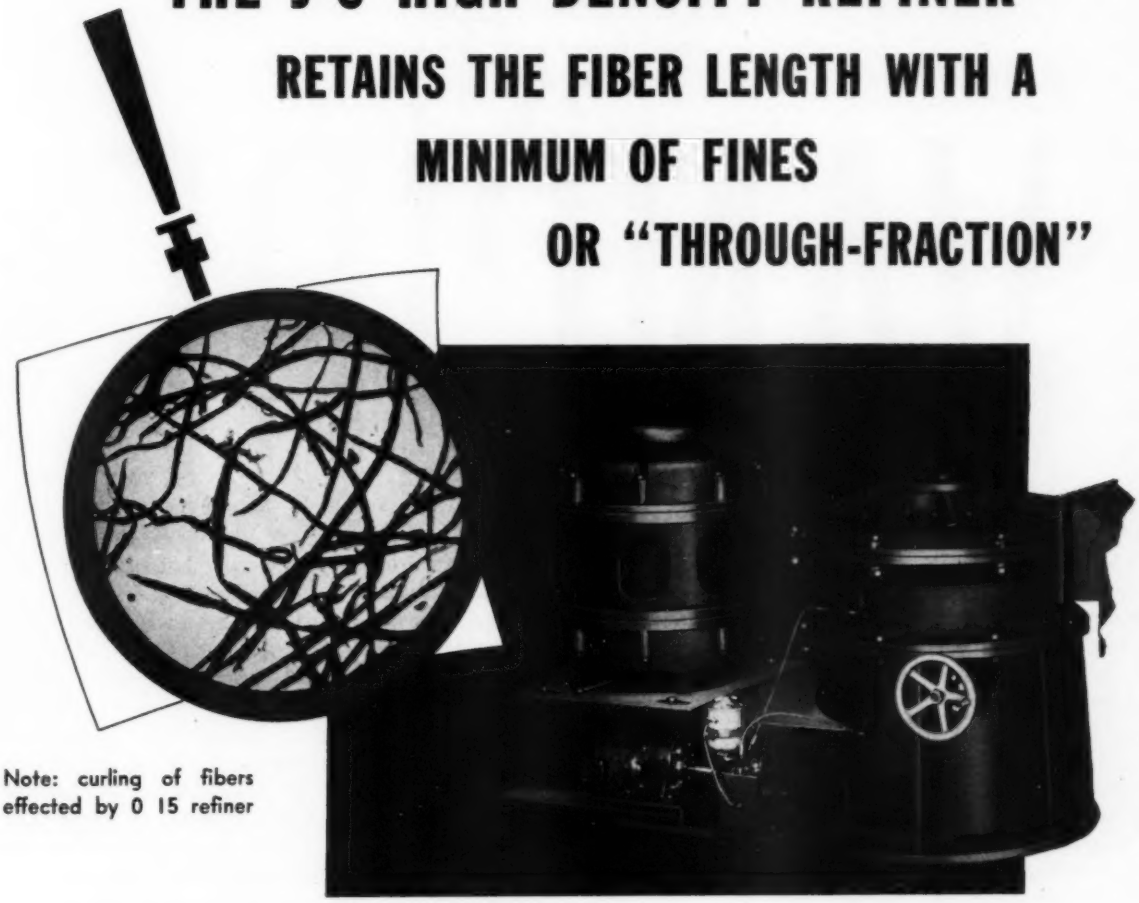
"O" RING SEALS



Type OB—Balanced "O" Ring Seal

THE J-C HIGH DENSITY REFINER

RETAINS THE FIBER LENGTH WITH A MINIMUM OF FINES OR "THROUGH-FRACTION"



Note: curling of fibers effected by 0 15 refiner

USES: Defibering groundwood secondary screen rejects • Deshiving screened stock (groundwood)—chemical or semi-chemical • Defibering kraft and sulphite tailings • Will operate over a broad range of consistencies, but the specific power is exceptionally low at densities of 25% or higher • Self-cleaning—never plugs at any density • Has an inherently high capacity • Requires a minimum of floor space • Develops high mullen, tear and fold • Low in first cost and maintenance • Available in two sizes—with capacity of 25/50 tons/day or 75/150 tons/day • Used for introducing bleach solution uniformly into high density groundwood in the peroxide process • Develops appreciable curling as shown in photomicrograph above.

Manufacturers of the Zenith Continuous Pulp Press—Zenith Pulp Washer—High Density Refiner—Direct Heat Evaporator

J-C

A PRODUCT OF

JACKSON & CHURCH CO. • SAGINAW, MICHIGAN

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a non-toxic
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The Paper Industry

October 1951

Paper in a War Economy

One of the most essential ingredients in modern civilization, paper and the current problems affecting supply and demand, have been frequently brought to attention in newspapers and general magazines. One such instance occurred recently in *Printer's Ink* for September 14, when P. B. B. Andrews (former industrial economic adviser, Pulp, Paper, Printing & Publishing Division, War Production Board, analyzed and outlined the pulp and paper situation insofar as it affects the growth of magazine and newspaper advertising. He has highlighted a number of interesting facts about the industry and some of his comments seem worth passing on.

In describing the normal wartime production pattern he notes a shift in emphasis from paper to paperboard as demand grows for containers for shipping war goods. For instance, from 1941 to 1945 production of paperboard increased from 39 to nearly 44 percent of total paper and paperboard production. Printing papers were the main losers while certain grades such as blueprint paper, map paper, etc., gained slightly. This wartime shift is worth noting when one considers the fact that government requirements are rising rapidly even though they are still a relatively small percentage of total consumption.

Even with increasing government demands, however, production has for the most part kept pace with demand even though per capita consumption in the United States for 1951 is estimated to advance to 400 lb. To meet this high demand the 1951 production should go over 27 million tons compared with about 24 million tons for 1950. This production, plus nearly 5 million tons of Canadian newsprint, is expected to provide an adequate supply even though shortages exist from time to time in various segments of the industry.

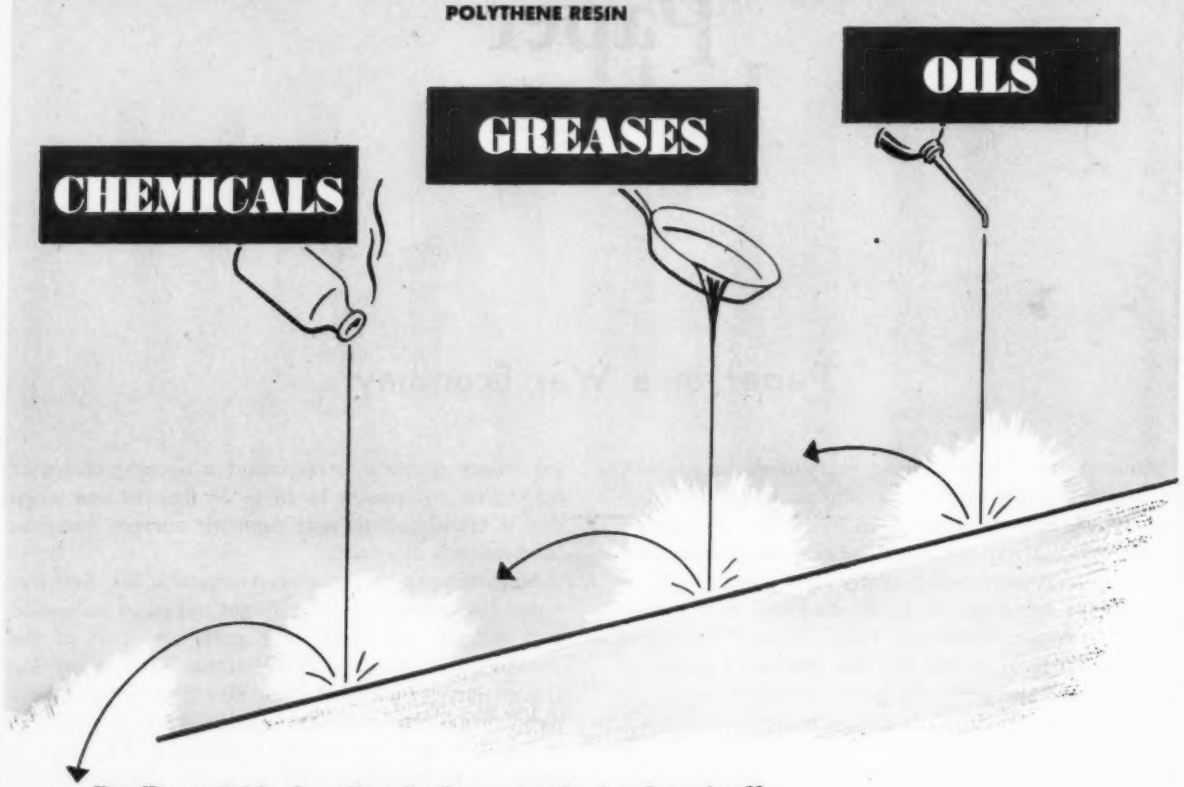
Even though current supplies have advanced to a point somewhat beyond demand, the defense program will probably take up the slack even though production capacity is still rising. Pulp and paper machinery manufacturers report a backlog of orders for capital equipment of 18 to 26 months and when this is translated to mill capacity another jump in production will result.

Regarding the raw material situation, Mr. Andrews noted the current pressure to get out more pulpwood and to build up supplies of pulp. As part of the mobilization program, the National Production Authority has requested the Forestry Service to make a nationwide survey of the equipment, supplies and manpower used in logging operations. This survey should help to provide an economic justification for proposed expansion of pulp and paper facilities. It is pointed out, however, that while such developments are promising, their benefit lies somewhat in the future and would not aid in any unbalance in supply and demand in the near future.

As far as allocations are concerned, any future system is expected to have a stronger impact than the World War II program. The unusually heavy printing papers in use before the war gave many publishers an escape into the use of lighter papers. In this manner, by trimming margins, and applying other economies, publishers were able to stretch their tonnage requirements and still remain within paper limitations. While similar economies would still be possible, they are limited because the average general magazine now prints on approximately a 43-lb. base paper which is considerably less than that used before the war. It was concluded that even with a strong war economy under way, magazines and newspapers appear to be in a good position to handle any increases in advertising from the standpoint of paper supply.

Mr. Andrews' conclusions might well be extrapolated to encompass most major classes of paper and paperboard consumers. With some fifty firms having been granted certificates of necessity and with a total of around $450,000,000 in rapid tax amortization approval, production capacity seems well on its way to further new highs.

Coatings of ALATHON* on paper resist



Du Pont "Alathon" polythene resin is chemically inert, and is tasteless, odorless and non-toxic. These properties make paper coated with "Alathon" ideal for packaging a wide range of products from chemicals to foods.

"ALATHON" STOPS WATER VAPOR. Coatings of "Alathon" have a low water-vapor transmission rate . . . keep dry products dry, moist products moist. They do not become brittle or crack with age . . . remain flexible, even at temperatures as low as -70°F. That is why paper coated with "Alathon" is outstanding for packaging frozen foods, ice cream and other products which must withstand low temperatures.

"ALATHON" IS TOUGH AND STRONG. A thin coating of "Alathon" on kraft, glassine and other papers takes rough handling without breaking or tearing. And this superior coating is economical. One pound of "Alathon" will cover 30,000 square inches of paper with a 1-mil coat.

"ALATHON" FOR MORE SALES IN THE FUTURE. Because of its outstanding chemical and physical properties, manufacturers and processors of many kinds of industrial and consumer goods will want paper coated with "Alathon" for their packaging material. Plan *now* to profit with "Alathon."

Present demand exceeds our production. But by planning now, you'll be able to move fast when "Alathon" is available. Write for more information about Du Pont "Alathon" polythene resin . . or for technical assistance. We'll be glad to help you. *REG. U. S. PAT. OFF.

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The Paper Industry Current Comment

Newsprint cycle

Is the long continued drive for the installation of new newsprint mills in the United States and Alaska another step in the historic cycle by which excessive output of newsprint has depressed the market to a point where at times the mills were forced to operate at a loss?

That question arises when it is reported from official sources that stocks in the hands of newspaper publishers are increasing, at a time when there are continued reports of new installations, and congressional studies of reputed shortages and high prices.

When Canada entered on its large scale of newsprint production and caused the suspension or bankruptcy of many United States mills, such a degree of overproduction was attained that the Canadian mills went into the hands of their creditors because a surplus of output broke the market price.

The Canadian industry, which is sensitive to the need of United States markets for the bulk of its output is not being deluded into the building of more mills, despite increased American consumption. Only one new mill is in prospect, while other mills are more and more going into the production of finer papers, a large part of which is for the American market. Imports of Canadian printing papers is now at a rate of 4,000 tons per month, with a value of half a million dollars, and only the high demand in the United States for all grades of paper has saved the domestic producers from critical market conditions. Meanwhile stocks of newsprint in the hands of publishers is approximately 45 days supply, the highest figure since early 1950.

A national magazine has recently analyzed the newsprint picture with the comment that there is something of poetic justice in the screams of the publishers about the rising price of their major element of cost. It was pointed out that the present high price is the direct result of the unwillingness of investors to finance newsprint mills because of losses in the past.

The question whether the historical cycle is being repeated is not, naturally, immediately answerable. It will take time to determine whether paper manufacturers will be led into investments for the production of newsprint to an extent that will result in a new period of oversupply and consequently price depression.

Paper continues tight

As the fall months approached, there was not the usual seasonal dip in demand for paper and paperboard, and in general supplies are tight, with the mills enjoying a material back log of orders for practically every grade. The prospect is for an increasing tightness as the fall advances. The supply shortage is greatest in the wrapping paper field, both kraft and sulphite, with printing papers in not much greater supply. Inventories are meagre in the principal tonnage grades, though the easiest part of the picture is in the minor specialty fields. Government demand has contributed to the tight position in the tonnage grades.

A hint of speculative operations is heard in some quarters, not exactly to the black market stage, but of an unhealthy character. Some converters are reported to be accepting their quota of paper from the mills and then diverting the unneeded surplus into irregular channels of delivery to other buyers. This practice is being studied by the mills and it is possible that quotas will be decreased for those engaged in this practice.

The writing and bond grades are in good demand, with as a rule the mills unable to make deliveries in better than a month after the acceptance of orders.

Sulphur shortage hasn't hurt pulp production

An odd situation has developed in the pulp field, despite the problems raised by the setting of import ceilings for Scandinavian pulp. There is such a sufficiently large volume of market pulp available that the Washington authorities may allow the allocation of slightly larger tonnages for export. The pulp mills have, apparently, not suffered severely from the short situation in the sulphur field. It had been feared that a shortage of sulphur might react on the pulp output, but the fears have not so far been fully realized. While the immediate shortage may become more acute, news reports indicate the development in the future of an entirely new and extensive resource. The Freeport Sulphur company has discovered a large new deposit in the Mississippi river delta and will spend from ten to fifteen million dollars in development mining operations to produce over 500,000 tons per year. While the new field will not be producing until 1953 in any great quantity, the deposit is said to be the largest new field discovered in over twenty years. The new deposit, of an extra purity, was discovered during drilling operations for oil which comes from the flanks of the sulphur formation. In addition to this domestic new supply, plans are under way for expansion of mining operations for Ecuador deposits.

While the domestic industry is working to top speed in producing paper for the United States consumers, the struggle with Washington to secure the establishment of price ceilings commensurate with production costs continues unabated. Tailored orders for prices on specific grades are in process, with the chance that eventually ceilings will be established which will at least give the mills the basis on which to determine the grades on which ceilings will permit operations without an undue slash of profits.

Prices tied to profits

The paper industry, like other industries, does not like the administration trend toward the fixing of prices on a basis of producers' profits. The idea that no product should be allowed prices which will bring more than 85 per cent of pre-Korea profit percentages is an approach to the type of socialism which has made Great Britain the least prosperous nation in Europe. The same theory, which in the minds of some involves taxation to bring a maximum individual income to $25,000 per year is another trend to discourage industry by reducing the national incentive to go ahead in new fields, or to expand existing operations.

An interesting sidelight in the continuing disclosures of political profiteering through pressure on Government buying and lending agencies is the naming of R.F.C. figures in newly opened up leads to possible corruption who were named in earlier investigations of the Mobile Paper company case. The loan to parties interested in the Mobile Paper company development is still under investigation by a United States Senate committee.

K
ONLY NASH VACUUM PUMPS
HAVE ALL THESE FEATURES
One Moving Element. Non-pulsating Vacuum.
No Internal Parts In Wearing Contact. No Internal Lubrication. Handles Liquid With Air.
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NASH ENGINEERING COMPANY
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Financial reports

Paper mill securities advanced materially in the past month, but most of the higher prices were shown in the common stocks, as a hedge against inflation. Preferred stocks shared in the advance, but the sales have been inconsiderable in comparison with the volume of transactions in the junior securities. Paper mill bonds are being held principally for investment, to judge from the lack of transactions in the various stock exchanges.

Net incomes

American Writing Paper Corp.—Net income for six months ended June 30 was $351,484 as compared with $109,004 for the same period last year.

A.P.W. Products Co.—Net income for six months ended June 30 was $114,267, compared with $33,410 a year ago.

Armstrong Cork Co.—Net income for the six months ended June 30 was $5,283,181 as compared with $6,218,796 for the comparable period in 1950.

Celotex Corp.—Net income for the nine months ended July 31 was $2,680,988, compared with $1,388,486 a year ago.

Champion Paper & Fibre Co.—Net income for the quarter ended June 30 was $2,882,528 as compared with $2,278,861 for the same period in 1950.

Container Corp.—Net income for the first half of 1951 was $8,937,000 as compared to $4,458,000 last year.

Crown-Zellerbach Corp.—Net income for the quarter ended July 31 was $6,503,376, compared with $5,100,087 a year ago.

Great Lakes Paper Co.—Net income for the first half of 1951 was $1,818,810 as compared with $1,151,722 for the like period last year.

Hollingsworth & Whitney Co.—Net income for the first half year was $2,018,323 as compared to $653,065 for the first six months of 1950.

Kimberly-Clark Corp.—Net income for three months ended July 31 was $2,970,522 as compared with $2,877,979 last year.

Marathon Corp.—Net income for the nine months ended July 31 was $6,334,245, compared with $4,476,592 for the same period last year.

Seaboard Container Corp.—Net income for the six months to June 30 was $661,300 as compared with $94,000 in 1950.

Soundview Pulp Co.—Net income for the first eight months of 1951 was $3,385,452 as compared with $3,119,454 last year.

United Board & Carton Corp.—Net income for the fiscal year ended May 31 was $783,319, compared with $169,767 for the same period last year.

United Wallpaper, Inc.—Net income

ASTEN

dryer felts

LESS DOWN-TIME

Nothing lowers profits faster than down-time. That's why mill men everywhere like the long life and the steady, dependable performance of ASTENS.

Economy in the long run

ASTEN-HILL MFG. CO.
PHILADELPHIA, PENNA.

ASTEN-HILL, LTD.
VALLEYFIELD, QUEBEC

Control Costs with TOLEDO

On your scale material becomes money!

PRINTWEIGH STOPS ERRORS . . . Provides printed weight records—at the instant of weighing—assuring that the accurate indication of the Toledo dial will reach your accounting records without chance of human error.

Modern Toledos meet your needs today for *rapid, accurate* scales in all phases of production . . . to help you *control costs!*

These are the scales backed by Toledo's half-century of experience in Research and Engineering that has produced 80% of the major advances in scales during this time.

Toledo engineering has not only specialized in the direct design of weighing machine mechanisms, but also in the many associated fields such as electronics, plastics, metallurgy, optics.

Check your needs *now*—select Toledo equipment for vital jobs in guarding materials and costs! Sales and service in 200 cities. Toledo Scale Company, Toledo 1, Ohio. We will be very glad to send catalogs.

NEW!
FLOOR SCALES
New recessed frame design fully guards against foreign material lodging beneath platform edge—choice of full or semi frame, with economical conversion for future needs. Double parallel link platform suspension means long life, accurate dependability. Send for bulletin 2406C.

TOLEDO

HEADQUARTERS FOR SCALES

for the year ended June 30 was $743,258, as contrasted with a net loss of $592,689 last year.

Sutherland Paper Co.—Net income for three months ended June 30 was $839,765 as compared with $765,387 in the same quarter a year ago.

Union Bag & Paper Corp.—Net income for the first half of 1951 was $7,358,079 as compared with $4,549,208 for the same period in 1950.

West Virginia Pulp & Paper Co.—Net income for nine months ended July 31 was $7,983,000 as compared with $8,101,000 for the same period in 1950.

Dividend declarations

Fibreboard Products, Inc., has declared a dividend of 25 cents per share on its common stock, payable September 28 to stockholders of record September 20.

Great Lakes Paper Co. Ltd. has declared an initial dividend of 25 cents per share on its new common, payable September 29 to stockholders of record September 10.

Minnesota & Ontario Paper Co. has declared a quarterly cash dividend on its common stock of 50 cents per share, payable October 25 to stockholders of record September 28.

Puget Sound Pulp & Timber Co. has declared the regular quarterly dividend of 50 cents per share on common stock, payable September 28 to stockholders of record September 7.

Richardson Co. has declared a dividend of 35 cents per share on common stock, payable September 28 to stockholders of record September 14.

Ruberoid Co. has declared a dividend of 75 cents, payable September 25 to stockholders of record September 10.

Sorg Paper Co. has declared a dividend of 25 cents a share on $10 par value common stock, payable September 25 to stockholders of record September 18.

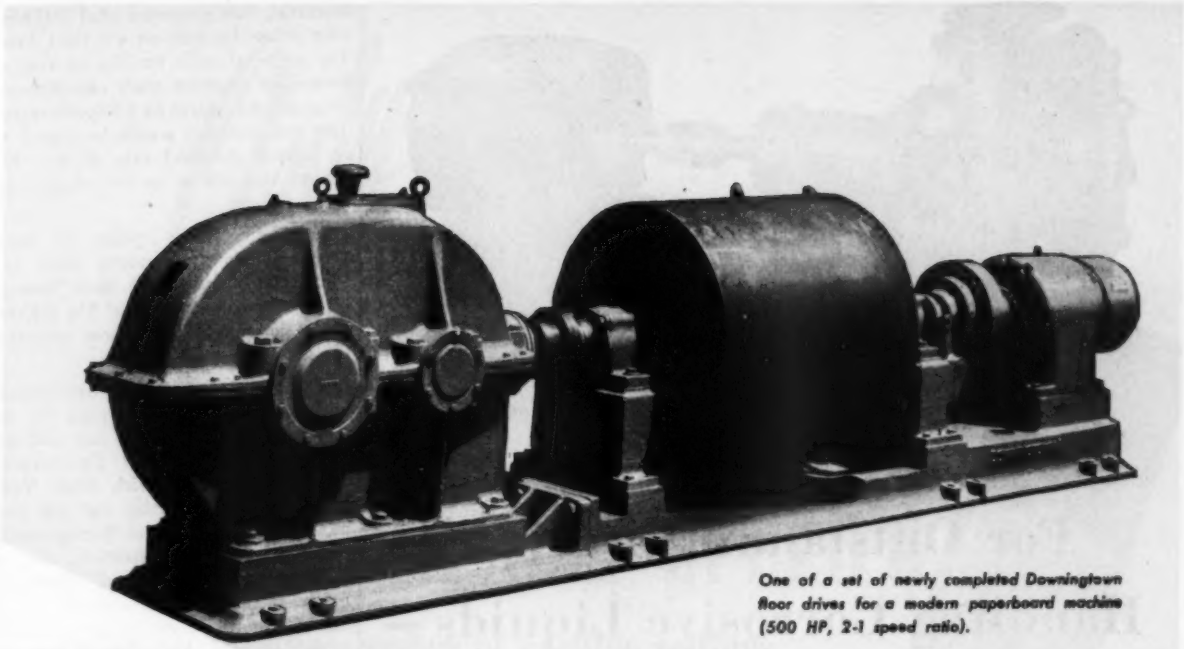
Crystal Tissue Co. has declared a regular quarterly dividend of 15 cents per share of common stock, payable September 29 to stockholders of record September 20.

Union Bag & Paper Corp. has declared a regular quarterly dividend of 50 cents per share and an extra dividend of 50 cents on the capital stock, both payable September 14 to stockholders of record September 7.

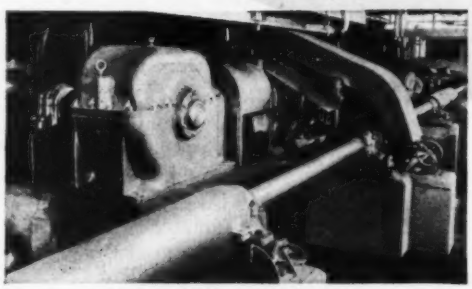
Paper mill corporate changes

American Box Co., Grand Rapids, Mich., has made, through a Wall Street brokerage house, an offering of $5,000,000 in first mortgage sinking fund bonds carrying 4⅜ per cent interest. The proceeds will be used to add a second paperboard machine at its Manistee plant and for other related improvements.

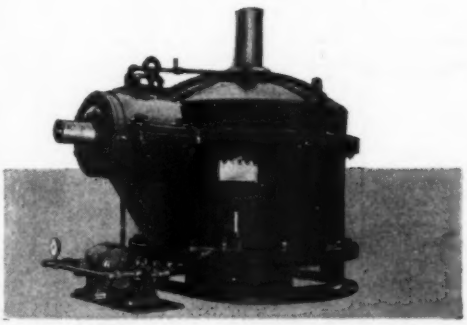
Howard Smith Paper Mills Ltd.,



One of a set of newly completed Downingtown floor drives for a modern paperboard machine (500 HP, 2-1 speed ratio).



Downingtown Spiral Bevel Gear Drives recently installed on a Downingtown roofing felt machine. Note vari-pitch sheaves.



Gear Drive designed for a large capacity Downingtown Fibre Pulper.

keeping paper machinery ···ON···THE···GO!

Downingtown Spiral Bevel Gear Drives are actually "tailor made" for the machines on which they are to be used . . . whether as replacement equipment or when supplied with new machines. Thus, they keep mill machinery "on the go" more economically and efficiently . . . insure proper speed control and a minimum of horse power loss in the transmission of power.

Consult Downingtown on power transmission for mill machinery.

DOWNINGTOWN MANUFACTURING CO., DOWNINGTOWN, PA.

Pacific Coast Representative: John V. Roslund, Pacific Bldg., Portland 4, Oregon

DOWNINGTOWN

SPIRAL BEVEL GEAR DRIVES

DESIGNERS AND BUILDERS OF PAPER, BOARD AND FELT MACHINES SINCE 1880

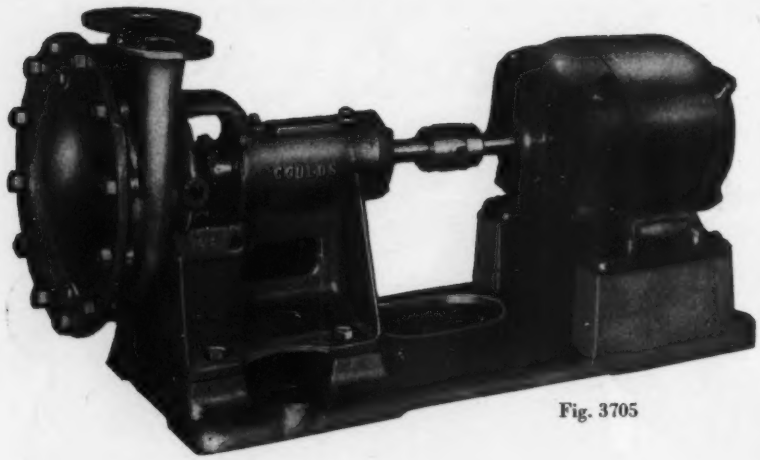


Fig. 3705

For Outstanding Service Handling Corrosive Liquids—

Goulds new stainless steel centrifugals

ADVANCED PUMP DESIGN—

The Goulds 3705 stainless line represents the last word in effective design. Fig. 3705 pumps will give you efficient, dependable, 24-hour service in handling corrosive liquids—at low cost.

CAPACITIES—

Goulds stainless steel centrifugals are made in 9 sizes with capacities to 750 G.P.M. and heads to 180 ft. depending upon capacity.

ADVANTAGES—

Exceptional efficiency (see Bulletin for performance curves) plus extreme simplicity make this an ideal pump for corrosive applications. High interchangeability of parts cuts stocking problem. Quick inspection or cleaning—simply remove casing cover without disturbing pipe connections.

MEMBER HYDRAULIC INSTITUTE U.S.A.

Write for Bulletin 725.3 for complete details on this new stainless steel pump.

Goulds PUMPS INC. Seneca Falls New York

Montreal, has proposed that its common shares be split on a 4-for-1 basis. The proposal calls for the increase of authorized common share capitalization from 400,000 shares to 2,500,000 shares. The new common would be placed on an annual dividend rate of $1. The present common is on an annual basis of $3 a share.

Lily-Tulip Corp. plans to retire $2,400,000 in outstanding notes and $3,000,000 in preferred stock through direct sale of $7,000,000 of 3¾ per cent notes due in 1971 to three insurance firms.

National Container Corp. has formally announced the financing plan for the major expansion that the firm will undertake at Valdosta, Ga. Two transactions are involved, with New York, N. Y., financiers acting for the company. One phase of the development is the offering of $20,000,000 in 4½ per cent 15-year sinking fund debentures, priced at 100, and the other an issue of 480,000 shares of convertible preferred, offered at 26¼ per share. Of the proceeds from the sale of the preferred, $6,422,000 will be used to prepay notes of the company due in 1964.

S. D. Warren Co. has borrowed $1,200,000 from a Boston bank on notes due serially to September 30, 1955. Interest on the loans is payable at the rate of 2½ per cent until September 30, 1953, and then 2¾ per cent to maturity.

New York Stock Exchange—Stocks
(Closing Prices)

	Sept. 20, 1951	Aug. 20, 1951
A. P. W. Products	7⅛	7¼
Celotex	19⅝	16½
Same Preferred	17¼	* 16¾–17⅛
Certain-teed Products	17¼	16⅝
Champion P.&F. Co. (new)	* 29¼–29¾	30
Same Preferred	102	103
Chesapeake Corp.	* 38–38½	* 35¾–37
Continental Diamond	15⅝	14½
Container Corp.	40⅛	40⅝
Same Preferred	*101½–103	*103–104
Crown Zellerbach	56	52⅝
Same Preferred	*102–102¾	*101¾–102½
Dixie Vortex	72¾	66½
Eastern Corp.	22	22½
Robert Gair	17⅜	16⅛
Same Preferred	19⅛	* 19⅜–19¾
Gaylord Container	35	33
International Paper	51⅞	51½
Same Preferred	102	*102½–103½
Kimberly-Clark	49½	45
McAndrews & Forbes	42⅝	40½
Marathon	51⅞	44½
Masonite	34½	30⅝
Mead Corp.	29¾	27⅝
Same Preferred	102	* 91½–94½
Same 2nd Preferred	* 73–80	* 66–75
National Container	13⅝	14
Rayonier, Inc.	59¼	62⅜
Same Preferred	36⅛	* 36½–36¾
Scott Paper	58¼	* 51–52½
Same $3.40 Preferred	* 88½–90	91
Same $4.00 Preferred	*102½–104¾	106
St. Regis	17⅛	16¼
Same Preferred	* 93–95	92
Sutherland Paper	27	27½
Same Preferred	108½	*107–108¼
Union Bag & Paper Co.	50¾	45⅜
United Board & Carton	* 16¾–17⅛	16
United Wall Paper	4	3⅜
Same Preferred	* 26–26⅝	25½
U. S. Gypsum	115½	118⅜
Same Preferred	*173½–178	*175–178
West Va. P. & P. Co.	98	90
Same Preferred	*107–108½	*106½–108

New York Stock Exchange—Bonds

A. P. W. Products	.....	.....
Celotex 3½%	.....	.....
Champion P. & F. Co. 3%	.....	.....
Mead Corp. 3%	.....	.....

New York Curb Exchange—Stocks

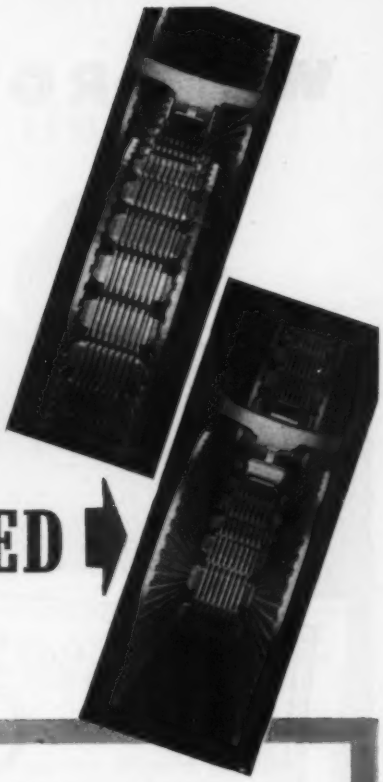
Am. Writing	11¼	11
Great Northern	56⅝	57
Hammermill	41	40

*Closing Bid and Asked Prices.

Only the P.I.V. variable speed drive has tooth-grip action . . . from

MAXIMUM SPEED to MINIMUM SPEED

with an infinite number of positive settings

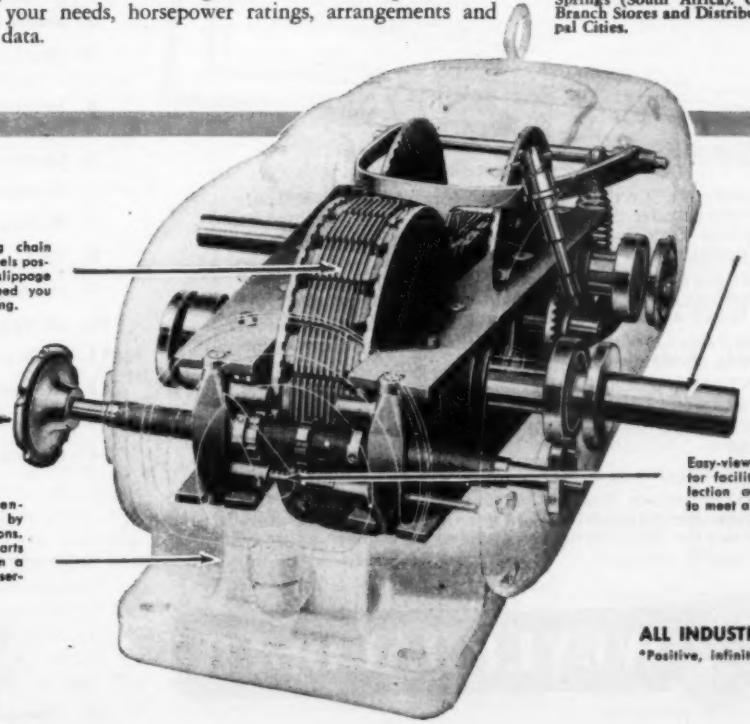


Only Link-Belt's P.I.V. delivers *positive*, stepless speed changing independent of friction . . . because only Link-Belt's P.I.V. has the self-tooth-forming chain that makes this possible. Your nearest Link-Belt branch office can show you how to increase the efficiency and flexibility of your machines, and supply complete information —covering pre-selection of the right P.I.V. variable speed transmission for your needs, horsepower ratings, arrangements and engineering data.

LINK-BELT P.I.V. VARIABLE SPEED DRIVE

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices, Factory Branch Stores and Distributors in Principal Cities.

12,290



Self-tooth-forming chain grips toothed wheels positively without slippage — gives the speed you need at any setting.

You can get minute speed changes and maintain them accurately while operating under full load.

An infinite number of positive, stepless speed adjustments may be made with manual, electric, pneumatic or hydraulic controls.

Easy-view speed indicator facilitates speed selection and adjustments to meet all requirements.

All-metal, totally enclosed — unaffected by atmospheric conditions. All vital operating parts splash-lubricated from a common housing reservoir.

ALL INDUSTRY USES P.I.V.*

*Positive, infinitely variable

WE GROW TREES

WEST COAST TREE FARMS
AFFILIATED WITH AMERICAN TREE FARMS
This Certifies that the forest lands of
are being protected and managed under consciously applied forest practices for the continuous production of commercial forest crops.
In recognition thereof, these lands are hereby designated a WEST COAST TREE FARM by the Joint Committee on Forest Conservation
Chairman, Joint Committee on Forest Conservation
Certificate No. Issued at Seattle, Washington

To qualify as a "Certified Tree Farm", forest land must be operated according to certain rules that apply all over America. Weyerhaeuser instituted the first Tree Farm in 1941, and by March 1, 1951, there were 2,980 Tree Farms operating 23,086,100 acres in 31 states!

In the west, Tree Farm rules are applied by the Joint Committee on Forest Conservation. Forest engineers help this Committee study the plans for an area before a Certificate (shown above) is issued.

A Tree Farm Certificate can be cancelled where the owner has not met the following requirements:

MAINTAIN a specified area of land for permanent production of forest crops.

PROTECT this area from fire, insects, disease and excessive grazing.

HARVEST timber in a manner which will assure future crops.

The Weyerhaeuser Timber Company policy of carefully harvesting trees, utilizing them to the fullest, and growing more trees for many tomorrows, guarantees the Pulp Division's customers an assured supply of woodpulp.

WEYERHAEUSER TREE FARMS

1. **Snoqualmie Falls**
2. **White River**
3. **South Olympic** (cooperative ownership)
4. **Schafer Bros.** (cooperative ownership)
5. **Clemons**
6. **Willapa**
7. **McDonald**
8. **Vail**
9. **Mt. St. Helens**
10. **Calapooya**
11. **Millicoma**
12. **Klamath Falls**
13. **Skykomish**
14. **Copper Creek**

The Paper Industry News of the Industry

Scott-Soundview Merger Discussed

Executive officers of Scott Paper Co., Chester, Pa., and Soundview Pulp Co., Everett, Wash., have discussed informally the general terms of a proposed merger of the two firms. The proposal is to be submitted to the respective boards of directors and, if approved, will be presented to holders of common stock.

It is reported that the basis for the merger would be the issuance of 1,220,625 shares of Scott common in exchange for 976,500 shares of Soundview common. Scott's currently outstanding common and preferred shares will remain outstanding.

Not only would the proposed merger provide a site for the building of a Scott paper mill on the West Coast, but it would also provide the economic advantage of integrating raw material production with the manufacture of finished products.

Allan Hyer Gets NPA Post

Allan Hyer, vice president of sales for Bagley & Sewall Co., has been appointed consultant to the new equipment and facilities branch of the Pulp, Paper and Paperboard Div. of NPA. The announcement was made by John W. Maloney, director of the division. Mr. Hyer will serve as adviser to the division with regard to pulp and paper mill machinery and related facilities.

August Newsprint Production Breaks Monthly Record

Total North American newsprint production of 580,622 tons during August exceeded any figures for that month on record. Output in Canada (including Newfoundland) amounted to 484,563 tons, with shipments of 480,581 tons. Production in the United States was 96,059 tons, and shipments were 94,488 tons. The total for shipments was 575,069 tons. Similar production and shipment totals for August of last year were 559,320 and 510,539 respectively.

Canadian mills produced 188,434 tons more in the first eight months of 1951 than in the corresponding period last year, an increase of 5.4 per cent. The output in the U.S. was 71,316 tons, or 10.7 per cent, more than in the first eight months of 1950. The total continental increase was 259,750, or 6.2 per cent more than in the comparable period last year.

Stocks of newsprint at the end of August were 148,957 tons at Canadian mills and 10,191 at U.S. mills, making a combined total of 159,148 tons, compared with 153,595 on July 31 and 193,422 at the end of August a year ago.

Kalamazoo Mills Receive Warning on Pollution

Paper mills in the Kalamazoo, Mich., area have received notification by the state water resources commission that October 15 has been set as the deadline for submitting proposals in writing for sharply reducing pollution of the Kalamazoo River. This "compromise" offer was sent to the 11 managements of the 15 mills in the region.

The proposals suggested by the commission would be alternatives to the long-pending blanket orders requiring the various mills to abate pollution by June 1, 1954. Final action on the river cleanup is scheduled for October 24. The latest action is designed to permit each mill to program its own abatement schedule within a definite period before and after June 1954, rather than to set June 1 of that year as the single date for all abatement.

Accomplishment of the programs will be contingent upon availability of materials. Each commitment is to assure the equivalent accomplishment called for in the May 1951 order.

Industrial Forests Called Vital to Economy

The importance of industrial forests in the overall economy of Wisconsin was emphasized recently by N. S. Stone, vice president and general manager of Mosinee Paper Mills Co., in an address before the fifth annual session of the Wisconsin Press Association. The meeting was held at the Trees for Tomorrow Camp in Eagle River.

Ten Wisconsin wood-using industries control 606,000 acres of forest lands in the state, where approved practices in planting, trimming, infection and fire control, and cutting are carried out. It has been emphasized that private industry is in a better position to practice intensive forestry than many units of government, mainly because the various government agencies do not have the funds necessary to approach forestry from an intensive standpoint.

Mosinee has recently devised a sustained yield forest management program for its 76,000-acre industrial forest. Through tree planting, timber stand improvement work, and silvicultural practices the firm expects to receive approximately 20,000 cords per year on a sustained yield basis by 2000 A.D. In 1950 an estimated 26,000,000 seedling trees were planted in Wisconsin, but experts maintain that this must be stepped up to 35,000,000 to assure maximum timber production in 40 years.

Industry Geared to High Production Requirements

The paper manufacturing and distributing industry is currently geared to take care of both defense and civilian needs. This belief was expressed recently by John E. Franzen, administrator for the Pulp, Paper and Board Div. of NPA, in an address before a meeting of the Philadelphia Paper and Cordage Association. Mr. Franzen is on leave as manager of sales research for Hammermill Paper Co., Erie, Pa.

It is believed that current production increases will take care of government requirements, provided the international situation remains as it is now. In addition, it is indicated that plans now in the making for new production facilities will keep pace with most needs in the

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years to come. At the moment, the greatest government requirements are in the writing and offset fields.

Timber Rights Given Swiss Firm

It has been reported that a large Swiss concern has been granted rights to cut timber in Labrador. The firm is capitalized at C$3,000,000 and is to employ some 1,500 men. The Newfoundland government will receive US$5 a cord as stumpage. Cutting rights guarantee 200,000 cords a year. The amount to be paid the government as stumpage, should the market fall, may be reduced, but not below US$2.50.

The corporation is to have cutting rights over about 1,500 square miles in the Lake Melville area, said to contain an estimated 8,000,000 cords of timber. According to reports, the Swiss firm will establish two townsites, including schools, churches, and other modern facilities. A chair for the teaching of silviculture is to be established at St. John's Memorial University, as well as a forestry farm where the latest techniques in forestry and agriculture will be taught.

Forestry Museum Planned for Portland

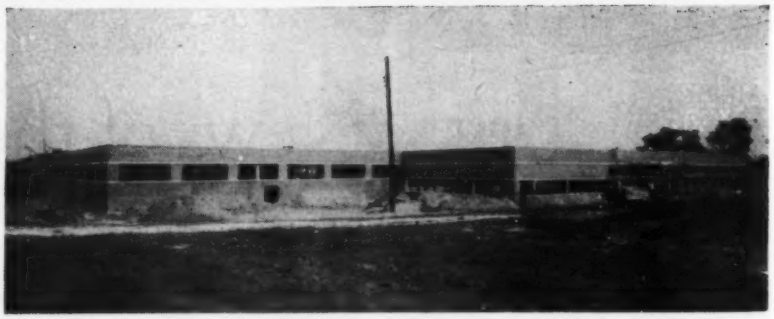
Exhibits depicting the many phases of the lumber and wood industries will be included in a museum of forestry that is to be created in Portland, Ore., under the direction of the chamber of commerce. The exhibition will be housed in a huge log cabin constructed in 1905 for the Lewis and Clark Exposition.

Planned as a "showcase for the forestry industry of the entire Pacific Northwest," the museum is to be opened to the public sometime in November. The city park bureau has announced that the following fields will be represented: dendrology (the study of trees); pulp and paper; plywood and allied products; cedar, redwood and special wood products; wood research, and fabricators.

New Source of Paper to be Tested in South Africa

Cotine, a newly developed fibrous plant, is to be grown on an experimental basis in South Africa. Tests made by the Shirley Institute of Lancaster, England, indicate that cotine fibers can be utilized in the production of bags, twine, and paper. Plantings will be made as soon as the South African government sanctions the import of seed.

The Institute has produced samples of twine, paper, and knitted and woven fabrics made from cotine. The plant requires about four months to grow and lives approximately 10 years. It has been estimated that production costs will be about 3 cents a pound.



PAPER MANUFACTURERS CO., Philadelphia converter, expects to occupy this new plant in the Bustleton section of the city about November 1. The facilities, for which construction was started on October 20 of last year, will include a covered railroad siding and is to feature modern equipment throughout.

Mill Expansion and New Construction

Expansion Details Given by Howard Smith Ltd.

Additional details of the multi-million dollar expansion program announced recently by Howard Smith Paper Mills Ltd., Montreal, have been reported by E. H. Smith, president. According to the announcement, the firm plans to construct a sulphate pulp mill at Crabtree Mills, Que., with an annual capacity of 40,000 tons. The cost of the project has been estimated at $8,500,000, with completion set for 1953. A large portion of the new mill's output will be used in the firm's Crabtree paper plant, resulting in a saving of pulp transportation.

An extensive program of plant modernization and extension, which is currently underway, is to include three Howard Smith divisions. A fourth Fourdrinier is to be installed at the Cornwall Div., with an expected production increase of 18,000 annual tons of book, writing, and related grades of paper. Capacity of the soda pulp mill at Cornwall will be increased by about 25,000 tons annually.

Another Fourdrinier is being added at the Merritton Div. of Alliance Paper Mills Ltd., Merritton, Ont. The installation is expected to raise the capacity for glassine, greaseproof, and similar papers by approximately 5,000 tons a year. New boiler plants are being constructed at both Cornwall and Merritton, while at the Arborite Div. additional new equipment now being installed is expected to increase capacity by about 50 per cent.

Atlanta Envelope Buys Tennessee Company

Atlanta Envelope Co. has announced purchase of Southern Envelope Manufacturers, Inc., Nashville, Tenn. Sigmund Held, formerly at Atlanta, has been made general manager of the Tennessee firm.

Acquisition of Southern is a part of expansion plans announced sometime ago by Atlanta Envelope. The firm is currently building a combined office, warehouse and manufacturing plant comprising 65,000 square feet at its home office. The new plant is to be completed by spring.

National Container Reports $32,000,000 Expansion

A $32,000,000 financing program for major expansion under a government certificate of necessity has been announced by National Container Corp., New York, N.Y. The funds are to be used in the construction of a 500-ton per day kraft pulp, board, and paper mill to be located near Valdosta, Ga.

The certificate of necessity will permit National Container to amortize 60 per cent of the new mill, not in excess of $23,165,000, over a period of five years. The mill, which it is anticipated will be completed in about two years, will increase the firm's annual production capacity by more than 50 per cent. The company's four pulp and board mills produced a total of nearly 300,000 tons in 1950.

The $1,000,000 box plant now under construction by National Container in Milwaukee is scheduled for completion January 1. The 140,000-square foot, one-story structure will be the firm's second plant in Wisconsin, a kraft box plant now being located at Tomahawk.

Plans for $2,500,000 Texas Newsprint Mill Announced

Tentative plans for the construction of a $2,500,000 odorless paper mill in Tyler, Texas, were announced recently. The plant is to be built by J. A. Johnson

and associates, who have formed a company known as Superior Paper Mills, Inc.

It is reported that the mill will process waste paper into newsprint, with a production schedule of 100 tons per day within six to nine months after construction begins. The mill will require a daily 1,500,000 gallons of water.

Certificates of Necessity

Brown Co.,
Berlin, N.H., has been granted a certificate of necessity for 65 per cent of $1,318,075 for wood pulp facilities.

Roanoke Rapids Paper Co.,
Roanoke Rapids, N.C., has been granted a certificate of necessity for 50 per cent of $2,600,855 for paper box board facilities.

West Virginia Pulp & Paper Co.,
Luke, Md., has received a certificate of necessity for 65 per cent of $3,500,000 for sulphate wood facilities.

Pacific Paperboard Co.,
Longview, Wash., has been granted a certificate of necessity for 50 per cent of $993,950.

Penobscot Chemical Fibre Co.,
Old Town, Maine, has been granted a certificate of necessity for 65 per cent of $817,717 for wood pulp facilities.

Fitchburg Paper Co.,
Fitchburg, Mass., has been granted a certificate of necessity for 65 per cent of $208,049 for wood pulp facilities.

Combined Locks Paper Co.,
Combined Locks, Wis., has been granted a certificate of necessity for 65 per cent of $369,765, pulp fibre and book paper.

Rayonier, Inc.,
has been granted a certificate of necessity for mill expansion at its Fernadina, Fla., plant. The firm is reported to be planning the installation of a new turbine, an additional digester, and other process improvements that will increase the capacity of the sulphite plant by about 25 per cent. This increase will be equivalent to approximately 2,400 tons of pulp a year.

Container Corp. of America
Chicago, has announced that Sefton Fibre Can Co., a wholly owned subsidiary with headquarters in St. Louis, has opened its new plant in Piqua, Ohio. Although planned as a manufacturing unit to augment the firm's production of fibre cans, the plant's initial output will be on a government order. Carl Wenstrup, formerly in charge of Sefton's Cincinnati office, is general manager.

An Alaska-Financed Corporation
is reported to be planning the construction of a $30,000,000 pulp mill near Juneau. According to the report, the plant will produce pulp for use in rayon and munitions making. First mill units, expected to be completed by 1955, will produce between 200 and 250 tons of pulp daily.

Hudson Pulp & Paper Corp.,
which recently increased the pulping capacity at its Palatka, Fla., kraft mill by 200 tons a day, has purchased 240,000 acres of pine timberland in northwest Florida. The tract was sold for a reported $3,500,000 by Perpetual Forests, Inc., and is part of a 4,000,000-acre tract assembled in the 1880's by Horace Disston, Philadelphia saw manufacturer. Hudson plans to continue development of the property on an accelerated scale.

National Gypsum Co.
has announced that the paper mill it is building in Pryor, Okla., is about 75 per cent complete. The new mill will produce a special liner used in the manufacture of fireproof gypsum board products, including gypsum lath, wallboard, and exterior sheathing.

Pacific Coast Paper Mills
of Washington, Inc., Bellingham, are constructing a $450,000 converting plant. The building is 80 by 200 feet, and occupancy was expected by the middle of October. Present converting equipment was to be moved into the new plant in addition to new automatic packing and sealing machines.

Whiting-Plover Paper Co.,
Stevens Point, Wis., is constructing a dam on the Wisconsin River near its plant. The dam is to be of concrete construction and will be 700 feet in length. Work is expected to be completed by December.

Hoberg Paper Mills,
Green Bay, Wis., are constructing a two-story addition to their plant to house a hydraulic barker. The total cost is reported to be in the neighborhood of $100,000.

Atlanta Paper Co.
has chosen Austell, Ga., as the cite of its proposed new waste paper board mill. The mill will be constructed adjacent to Austell Box Board Co. and will be operated in conjunction with that plant.

Flintkote Co.,
New York, N. Y., has broken ground for a $3,000,000 plant at San Leandro, Cal., to be operated by its Pioneer Div. Units under construction include a one-story, 134,400-square-foot building to house an 80-inch corrugator with a 500-foot per minute capacity, printer-slotters, stitchers, and tapers. A second building, comprising 32,400 square feet, will be equipped to produce paperboard at a rate of 100 tons per day. The plant is expected to begin operations in August 1952.

Hubbs. Corp.
has added a New Jersey division to handle a full line of fine and printing papers, industrial and specialty papers, including defense packaging items. The firm has announced that a one-story warehouse and office building being constructed at Hillside, N.J., is expected to be completed by the end of September. Both the Henry Lindenmeyer Div. and the Charles F. Hubbs & Co. Div. will be housed in the new building.

Columbia Bag Co.
has purchased a building containing about 7,000 square feet in Kansas City, Mo. The firm will occupy more than half of the space.

Pollock Paper Co.,
Dallas, Tex., has been granted a construction permit by the National Production Authority to build additional office space at a cost of $38,000.

Royal Papers, Inc.,
St. Louis, has taken a long-term lease on a two-story building containing 20,000 feet of floor space. The former occupant, Bermingham & Prosser Paper Co., has moved to new quarters.

Protective Papers, Inc.,
Union, Ill., is establishing a new mill in Hollister, Cal. The facility, which will serve the West Coast and adjoining states, was expected to be in operation by October 15. The firm's complete leatherback line of building papers and related products will be produced.

34,000 Colorado Trees Sprayed in War Against Beetle

During the first 10 days of the Forest Service's 1952 war against the spruce beetle, 34,000 Englemann spruce trees in Colorado were sprayed with insecticide. Eight 100-man camps, six of them manned by Indians, have been established, the newest ones being located in the Routt and White River national forests.

The Forest Service began its campaign at the end of August, shortly after receiving a $1,000,000 appropriation from Congress. Spraying is done from the ground by two-man crews. Tree trunks are doused to a height of 30 to 35 feet, although trees not badly infested may be treated to a height of only 6 to 8 feet. Application of the insecticide does not save the treated trees, but it does kill the beetle. If weather remains favorable until the middle of October, the Service hoped to treat approximately 400,000 trees.

Puseyjones Again!

Above: Aerial view of Union Bag & Paper Corp., Savannah, Ga. Recently new buildings have been constructed in the area at rear center.

Left: No. 1 Puseyjones Machine installed at Union Bag in 1936, and No. 2 Puseyjones Machine which went into operation in 1937.

Right: No. 4 Puseyjones Machine installed at Union Bag in 1942 is making liner board for corrugated shipping containers. Just visible at left is the No. 3 Puseyjones Machine which went into operation in 1937.

No. 6 Machine for Union Bag

The production of the world's largest kraft paper mill is made on Puseyjones machines.

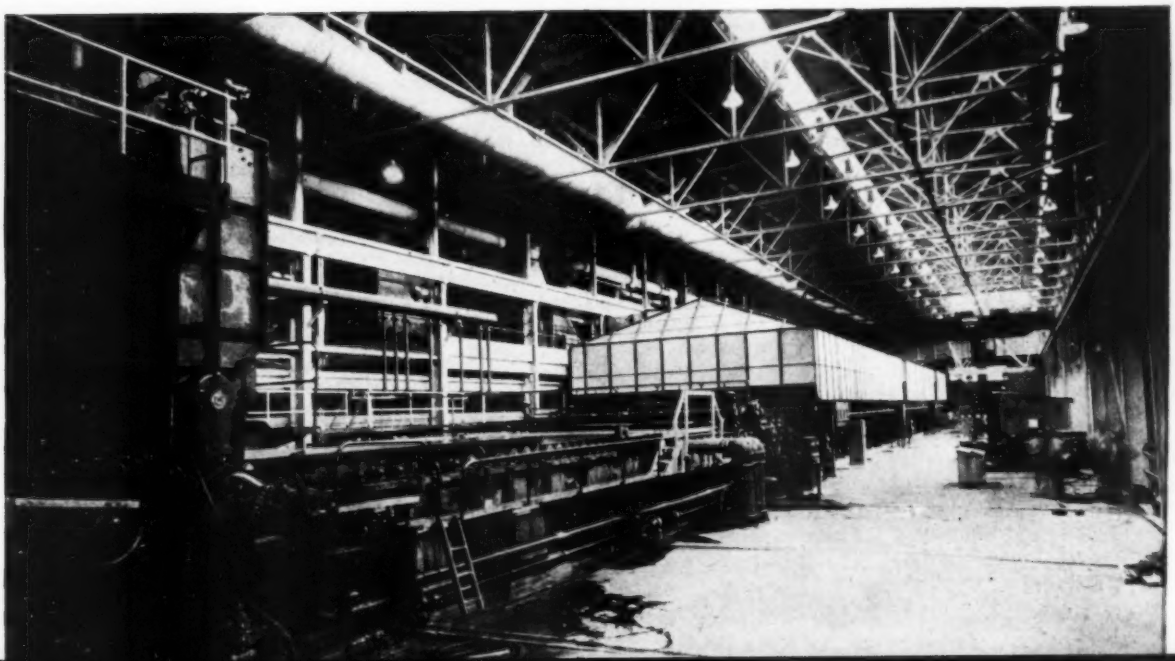
Five of these great Fourdriniers – each of 236" wire width – built over a 10-year period, 1936-46 – give Union Bag & Paper Corp., Savannah, Ga., a production of 1,400 tons of kraft paper and paperboard daily.

And now – Puseyjones is building a No. 6 Machine for Union Bag . . . another 236" giant, designed for a maximum operating speed of 2000 feet per minute which will increase production 300 tons a day.

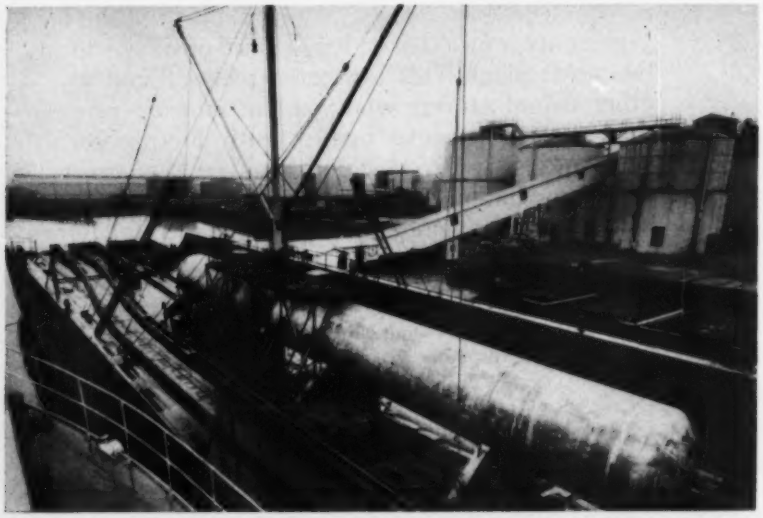
Puseyjones is proud of its long record of service to this great plant. This service is freely offered to other manufacturers who want to increase production and improve quality with Fourdrinier Machines, Cylinder Machines, Yankee Machines, or a combination of any of these types. Write or call for a Puseyjones technical engineer today.

THE PUSEY AND JONES CORPORATION
Est. 1848. Builders of Paper-Making Machinery
Fabricators and Welders of all Classes of Steel and Alloy Products
Wilmington 99, Delaware, U.S.A.

No. 5 Puseyjones Machine installed at Union Bag in 1946.



BON VOYAGE—From Hooker's Tacoma plant to British Columbia pulp mills the Griffiths Steamship Co.'s converted LST transports liquid chlorine and liquid caustic



DECK TANKS for liquid chlorine, below-deck tanks for liquid caustic, and tracks for railroad tank cars make the *Griffco* an important part of Pacific Northwest coastwise shipping

From Tacoma to Prince Rupert, Griffiths Steamship Co. transports

Liquid chlorine and caustic by tanker barge

FOR THE FIRST TIME on the Pacific Coast, bulk chlorine is being transported in fixed tanks on barges. This transportation service was announced several months ago by Griffiths Steamship Co., Vancouver, B.C., who worked in conjunction with Hooker Electrochemical Co. The project required several changes in U.S. Coast Guard regulations to permit shipments of liquid chlorine and caustic soda on the same vessel.

To provide the new service, Griffiths purchased an LST hull, which has been converted to a combination car barge, bulk caustic soda and chlorine carrier. The barge, known as the *Griffco,* is 277 feet in length, with a 50-foot beam and a loaded draft of eight feet. It is equipped with six individual below-the-deck tanks capable of carrying 1,500 short tons of 50 per cent caustic soda solution and special deck tanks equipped to carry 150 tons of liquid chlorine under pressure.

The steamship firm has inaugurated regular tug and barge service between Puget Sound and the British Columbia ports of Harmac and Watson Island. Contracts have been made with Columbia Cellulose Co. Ltd. and H. R. MacMillan Export Co. Ltd. (pulp division) for the transport of chemicals. Liquid chlorine and liquid caustic soda are provided by Hooker's Tacoma plant. The MacMillan pulp mill takes its requirements of bulk caustic soda from the under-deck cargo tanks and the chlorine in 55-ton railroad tank cars. Columbia Cellulose, at Watson Island, receives bulk liquid caustic soda in under-deck tanks and its chlorine in the specially designed 100-ton and 50-ton pressure tanks.

Because of the 21 ft. tidal range at Prince Rupert, inauguration of the service required the development of a special method of discharging the bulk chlorine. The special deck tanks for liquid chlorine had to be built and tested at 500 and 300 pounds working pressure, respectively, to conform with the A.S.M.E. code and Coast Guard requirements.

In addition to the *Griffco,* Griffiths operates two vessels, one of which, the *Mogul,* is a 157-foot tug with a 33-foot beam and a 16-foot draft. The tug, with the *Griffco* in tow, provides bi-monthly service to the British Columbia ports. The *Griffson,* a log-carrying barge, is now in British Columbia coastwise service.

Timber Being Cut on Lake Michigan Islands

Timber resources estimated at about 4,000,000 feet are now being tapped on several Lake Michigan islands. The first shipment, consisting of 100,000 feet of birch, maple, and hemlock, arrived at Escanaba, Mich., recently from Beaver Island.

Primarily for use in the paper, veneer and plywood industries, the wood was cut by Insula Corp. during the winter at Lake Gennesaret on the island. Tracts there were at one time considered inaccessible. According to Joseph B. McNameet, head of Insula, island lumbering is by "primitive methods." The logs are transported by sleighs to a high rollway, then rolled into the water. They then have to be pulled to a barge offshore. Transportation is the only bottleneck. The shipment received at Escanaba was brought in on a converted LST equipped with a mobile crane.

Insula has stumpage rights on 2,000,000 feet of timber on Beaver Island, 250,000 on High Island, 500,000 on Hog Island, 500,000 on Garden Island, and 750,000 on North Fox Island. Within the next few years the firm expects to take pulpwood off Whiskey, Hat, and Squaw islands.

Forest Fire Damage Continues High

Data contained in this nation-wide fire report was gathered from the regional U.S.F.S. offices by *The Paper Industry*.

With forest areas in many parts of the country parched from near record drouths, fires continue to rage uncontrolled through valuable timberlands. According to a report issued by the U. S. Forest Service on August 31, more than 307,000 acres had been burned over on national forest lands since the first of the year. A total of 8,762 fires had been reported from the various U. S. F. S. regions during that eight-month period. This contrasts sharply with the figures for all of last year, which show 233,357 acres burned in 8,135 fires. The average for the five years from 1946 through 1950 shows an annual loss of 160,812 acres.

The Pacific Northwest welcomed light rains which fell in the region September 23. The rain was not in sufficient quantity to check fires still raging in the area, but forecasters have promised more precipitation is on the way.

Of the nine Forest Service regions in the United States, California has shown the greatest loss, with 112,186 acres swept by flames since January 1. Second in total area burned was the Southwestern Region (Arizona and New Mexico), which reported 104,416 acres destroyed. Both areas are far above the five-year average.

Western coastal states remain the hardest hit with no improvement in fire conditions in one of the most prolonged dry spells in that area's history. In Washington a man-caused fire spread 18 miles from the westernmost edge of the Olympic National Forest in a 12-hour period on September 20. The logging town of Forks was threatened by its crackling intensity, and 1,200 residents had been prepared to evacuate the area. Another Washington fire had ripped through 800 acres of valuable Weyerhaeuser Timber Co. fir 27 miles southwest of Chehalis and was spreading uncontrolled.

Latest reports from California showed four wind-fanned blazes out of control. In the San Bernardino Forest, the Gaston fire had destroyed 12,000 acres six miles northeast of Banning. An estimated 33,000,000 feet of timber had been burned on 6,700 acres on Boardman Ridge in the Mendocino Forest, while 17,000 acres were ablaze on Milk Ranch Creek in the Plumas Forest area. A lightning-set fire in inaccessible territory on the Six Rivers Forest threatened to become a major blaze.

Acreage losses from fire in the Northwest have been the most serious since 1939, with an estimated 29,000 acres of national forest lands burned. The 1951 fire season has been characterized as one with as severe burning conditions as have ever been experienced in the region. Humidities from 10 to 20 per cent and winds from 20 to 30 miles per hour were frequent during July and August.

In issuing its latest fire report, the Washington, D. C., office of the U.S.F.S. warned that fire conditions in the southern part of the nation may be bad during October. Southern states report very dry weather, with critical conditions in Louisiana and parts of Texas.

The various forest service regions, in reports issued during the third week of September, have summarized the 1951 fire season as follows:

Northern Region

Offices at Missoula, Mont., report 1,672 acres burned in 882 fires on national forest lands. The region comprises Montana, parts of South Dakota, Idaho, and Washington. The area experienced a light fire season, with burning conditions at or below normal. The largest and most damaging blaze was caused by lightning in the St. Joe National Forest in Idaho. While it burned only 710 acres, it was estimated that approximately $100,000 in cedar poles and saw logs ready to be hauled were destroyed.

Rocky Mountain Region

Conditions in the southern part of the region (principally that part of Colorado south of Pikes Peak) were exceptionally severe during May, June, and July, but have eased off in recent weeks. In other areas fire conditions were below normal, with the result that the region as a whole had an average season. Statistics issued by the Denver headquarters showed 2,019 acres burned in 194 Colorado fires; 41 acres burned in 3 Nebraska fires; 50 acres burned in 104 South Dakota fires, and 163 acres burned in 41 Wyoming fires. No major blazes were reported in September.

Southwestern Region

According to the regional office at Albuquerque, N. M., this region (comprising Arizona and New Mexico) has experienced the most critical fire season in its history. Recent rains, however, have relieved conditions considerably. To date, 1,824 fires have burned in excess of 104,000 acres, and it has been estimated that 50,000,000 feet of timber have been damaged beyond salvage. A report from the regional forester in charge reveals that the most important loss during the season was in the destruction of watershed cover.

Intermountain Region

An unofficial report from the Ogden, Utah, office shows 4,623 acres burned in 482 fires. This region, covering Utah, Nevada, and parts of Idaho and Wyoming, suffered 447 fires in 1950, which damaged 3,359 acres of forest land.

California Region

Fire danger ratings this year are the most severe in 25 seasons. In addition, there have been several unusually long periods during which the fire danger has remained very high, which coupled with strong winds has caused several hundred damaging blazes. According to the San Francisco office, there have been 1,556 fires on 114,448 acres since January 1, with an estimated loss of 100,000,000 feet of timber.

North Pacific Region

The 29,199 acres burned to August 31 represent one of the most dangerous seasons in more than 10 years. A total of 699 fires have been reported from the Portland, Ore., headquarters. In both Washington and Oregon foresters reported renewal of a drying, warm east wind during the middle of September with a resultant lower humidity. However, the coastal area was experiencing fog with a corresponding high humidity and favorable fire conditions. It is hoped that the fall rains will allow the removal of logging restrictions ordered early in August.

Eastern Region

Philadelphia headquarters reports fire conditions generally good and a low incidence of blazes to August 31. However, autumn is a period of usual high danger, and over the southern portion of the area the late summer has been extraordinarily dry. A spokesman for the regional office has declared that the 250,000-acre blowdown in the November, 1950, hurricane created an explosively precarious condition that will probably persist for several years in the New York Adirondacks. The New England area is experiencing generally good rain conditions, normal conditions being reported from the Middle Atlantic states. So far in 1951 there have been 7,761 fires burning 109,317 acres, 344 acres being in national forests. States included in the region are Maine, New Hampshire, Vermont, Pennsylvania, Kentucky, West Virginia, New York, Massachusetts, Rhode Island, Connecticut, New

Jersey, Virginia, Delaware, Maryland, and the District of Columbia.

Southern Region

Unusual drought conditions continue except in the Appalachian highlands and at scatered points, where rain has fallen in negligible quantity. As a consequence, the number of fires, acres burned and estimated loss have been above normal. The Atlanta office has reported 2,256 fires on 42,370 acres. As of the middle of September there were no major fires.

North Central Region

Few if any fires are reported in this nine-state region due to heavy rains. By states, the 1951 record is as follows: Minnesota, 60 fires on 416 acres; Wisconsin, 24 fires on 49 acres; Michigan, 73 fires on 371 acres; Ohio-Indiana, 41 fires on 334 acres; Illinois, 31 fires on 580 acres, and Missouri, 350 fires on 8,335 acres. Totals for the region are 579 fires on 10,085 acres.

Figures released by the Forest Service's Washington, D. C., office show that thus far this year man-caused fires are running slightly below the average. In 1951 an estimated 48 per cent of the blazes were caused by human carelessness; last year the figure was 52 per cent, while the 1946-1950 average was 53 per cent. In the Pacific Northwest Region, where data are more complete, there have been 347 man-caused fires, not an alarming number considering the severity of burning conditions. Of this number, 10 were caused by railroading; 44 by lumbering; 80 by campfires; 130 by smokers; 23 by debris burning; eight were of incendiary origin.

Action Taken to Ease World Sulphur Shortage

With the sulphur shortage threatening industrial production throughout the world, new sources of supply of this basic raw material are being developed in at least 11 countries. At the present time 46 projects, including 24 in the United States, have been undertaken to produce sulphur in different forms from various sources.

In action designed to alleviate the newsprint shortage caused by the dwindling sulphur supply, Rep. McDonough (R., Cal.) on September 18 introduced a bill to increase by 50 per cent the amount of sulphur allocated by the National Production Authority for the American and Canadian newsprint industry. Rep. McDonough blamed the current lack of the mineral on scheduled exports to foreign countries under an international allocation program.

The projects now being developed are expected to add an estimated 3,000,000 tons to the present "free world" production by the end of 1953. Last year's noncommunist world output of 10,700,000 tons included nearly 6,000,000 tons produced in the United States. According to government sources, the sulphur shortage will get worse before it gets better, with 1953 set as the year in which supply will probably meet demand. The estimated shortage in 1951 has been given as 1,000,000 tons.

U. S. Leads in Development

The bulk of the added source of supply in the U. S. is expected from the development of new "salt dome" deposits along the Gulf Coast and the expansion of mines now operating in that area. Largest of the producers will be Freeport Company's newly discovered dome at Garden Island Bay, La., which is expected to produce an annual 500,000 tons by 1953. An additional 500,000 tons will be produced by three smaller domes: Starke Dome in Louisiana, which began operations in June; Spindletop in Texas, owned by Texas Gulf Sulphur Co., and Bay Ste. Elaine in Louisiana, being developed by Freeport. The expansion of Texas Gulf's Moss Bluff is expected to bring the total U. S. production of sulphur to 1,200,000 tons by 1953, with another 200,000 tons expected from a property being developed by Mexican Gulf Sulphur Co.

Standard Oil Co. of Indiana recently announced it has been granted government tax aid for a sulphur production plant it plans to build at its Whiting, Ind., refinery. The project will cost an estimated $1,720,000. The plant will recover elemental sulphur from refining fuel gases. When it is put into operation the output is expected to be 55 to 60 tons a day.

Government action in dealing with the shortage includes a recent National Production Authority order curtailing less-essential uses of sulphur and restricting inventories to a supply of 25 days. The former limit was three months. The agency said the action was necessary because of a 100,000-ton gap between sulphur requirements and estimated production in the fourth quarter of 1951.

Developments in Canada

Seven projects are now either underway or in the planning stage. One of the largest is the $2,500,000 expansion project now under construction by Nichols Chemical Co. Ltd. at Valleyfield, Que. Capacity of sulphuric acid facilities will be doubled. Initial production is expected in the spring of 1952. Acid will be produced by utilizing domestic sulphur-bearing ores as the raw material in place of elemental sulphur.

Construction was slated to start in September on a $350,000 plant at Turner Valley for Royalite Oil Co. Ltd. The plant, which will recover elemental sulphur from natural gas, is expected to go into operation next April, with an indicated capacity of 30 tons per day.

Six Canadian paper manufacturers have plans to establish their own supply of sulphur. Columbia Cellulose has an agreement with Howe Sound Co., Britiannia Smelting and Refining Co., to process iron pyrites that accumulate at the mine and will install conversion facilities. Powell River, in partnership with Shell Oil Co., is proceeding with production of elemental sulphur from Alberta natural gas. Consolidated Paper Co. is expected to spend close to $1,000,000 to construct its own plant to convert pyrites found in the province of Quebec. Donnaconna Paper Co. Ltd. plans to make its mills self-sufficient, while Anglo-Newfoundland Development Co. and Bowater Newfoundland Pulp & Paper Mills Ltd. are reported to have a joint venture based on Newfoundland pyrites.

The sulphur shortage is a severe threat to the Canadian newsprint industry, and a serious slowdown promises to result if further supplies of the mineral are not developed within the next few months. A spokesman for the Canadian Pulp and Paper Association has warned that the pulp production may slide within the next year and a half, creating a critical shortage of newsprint to U. S. consumers. Until Canada can build up her own sulphur resources, the spokesman continued, producers will be dependent on U. S. output. About 317,000 tons of sulphur will be used in the industry this year as compared to 285,000 tons in 1950.

Mexico

Deposits near San Felipe have been worked slowly during the past six months and have produced about 800 short tons. However, greater production is expected with the development of several marginal mines by the government. Much of the new machinery required is to be obtained through priorities from the U. S. The Azarco copper smelter at San Luis Potosi is reported to be turning out 40 metric tons of sulphur acid per day with plans of increasing this to 65 tons. Other mines are being expanded through government subsidy.

Brazil

The government is reported to be

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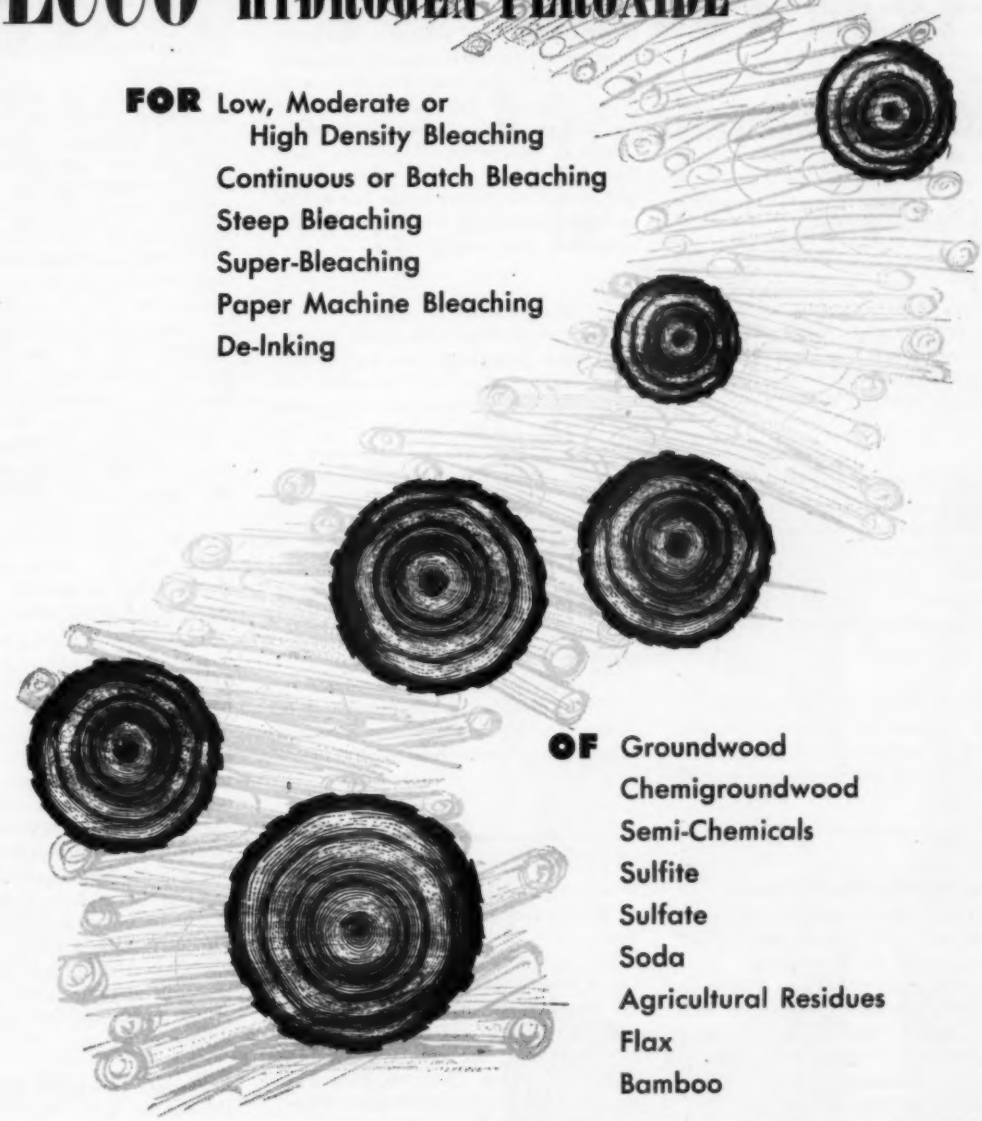

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studying the possibility of producing sulphur domestically by using pyrite deposits in the state of Santa Catarina. Current cutbacks in exports from the United States have caused concern throughout industry, particularly among sugar producers.

Ecuador

A U. S. firm, Chemical Plants Corp., has been awarded a contract to exploit deposits at Tixan. The company, which has leased the mines for 20 years, will install and operate a plant having a daily capacity of five tons.

Colombia

The only plant producing sulphur for commercial use, with mines near Popayan, is installing a treatment plant that has a capacity of 1,000 tons monthly. Operation is expected by early 1952.

Chile

The government has again authorized exports of sulphur. Suspension was ordered while definite regulations governing exports were being drawn up. It is reported that the first export of 1,200 tons will be followed by shipments of large quantity to European countries.

Spain

Expansion of pyrites production in Spain is planned by increasing the annual rate of output at mines in Huelva Province. The project is expected to add an estimated 400,000 long tons. Production is now only a little more than half the pre-war rate.

Great Britain

Leading consumers of sulphur in Great Britain have formed a syndicate to survey elemental sulphur resources in various overseas countries. It is to be called Sulphur Exploration Syndicate and includes such concerns as Imperial Chemical Industries, Monsanto, and Fisons. The first mission of the group will be in Chile. Other researches will be made in Central and South America, the Near East, Italy and Sicily.

Italy

To put its sulphur industry on a more competitive footing in the world market, the Italian government has started several programs that will ultimately increase production and reduce operating costs. The project, approved by the Council of Ministers and Chamber of Deputies, calls for the expenditure of about $14,400,000 for developing and modernizing the mines. Postwar production of sulphur increased to a high of 1,662,525 metric tons in 1950, which was still 30 per cent below the prewar top of 2,363,895 in 1938.

Eritrea

Four deposits have been discovered recently in Eritrea on the east coast of Africa. The ore available at the surface is said to total more than 100,000 metric tons.

Newsprint Allotments Asked

Recommendations recently announced by the International Raw Materials Conference meeting in Washington, D.C., call for emergency allocations of United States and Canadian newsprint to foreign publishers. The conference asked that 15,800 tons of newsprint now under contract to American publishers be sent instead to firms in 10 different countries.

The biggest allocation was assigned to Germany, which was granted 5,000 tons. Other nations included were Yugoslavia and France, 2,000 tons each; Indonesia, 1,500 tons; Brazil and Uruguay, 1,200 tons each; Spain and Chile, 1,000 tons each; the Dominican Republic, 500 tons, and Nicaragua, 400 tons.

More Firms Raise Newsprint Price

With the price of newsprint delivered at New York, N. Y., holding at $116 a ton, more producers have recently joined the move toward the general increase. Two exceptions to the $116 figure are St. Croix Paper Co. at $114 and Great Northern Paper Co. at $115. Canadian producers brought their New York price to $116 a ton July 1 with increases of $10.

On August 23 Coosa River Newsprint Co., Coosa Pines, Ala., announced a $5 per ton increase, making its New York price $116. This was the firm's second $5 increase in the month of August. Southland Paper Mills, Lufkin, Tex., announced a $10 boost effective October 1, making the delivered price in New York $116.

Newspaper Group Buys Newsprint Mill

Gannett Co., Inc., Rochester, N.Y., parent organization for a chain of 21 newspapers, has purchased Berwin Paper Mfg. Co. of Danville. Gannett will convert Berwin's present tissue-making facilities to newsprint, with a production aim of 60 tons a day within two years. The mill's present capacity is 14 tons per day, using cylinder papermaking machines. The purchasing firm's plans have been reported to call for the installation of a high-speed Fourdrinier designed especially for newsprint.

Ontario Timber Firms Grant Wage Boost

Following two weeks of negotiations, 19 of Ontario's leading pulp and paper companies and timber firms have signed a new contract with the AFL covering the large labor force in the northern Ontario woods.

Included in the agreement are the union shop, the first in Canada's logging industry outside of Newfoundland; a 14½ per cent wage increase, which it is estimated will cost the industry $50,000,000 a year; the checkoff system, and maintenance of membership.

The new agreement reached with the bush workers is expected to increase the production cost of newsprint by $2.50. In making this prediction, Earl Rowe, president of Great Lakes Paper Co., said producing companies will attempt to prevent a corresponding rise in the consumer price.

Speaking for the 19 Ontario pulp and paper companies and timber operators, Mr. Rowe said that the average 14½ per cent boost granted to the bush workers is only part of increased production costs. Higher "stumpage" dues announced by the provincial government August 23 will add an additional $1 per ton.

Kittel Named Midwest Regional Union Chief

William A. Kittel, Woronoco, Mass., has been named Midwest regional director of the AFL International Brotherhood of Papermakers. His headquarters are in Kalamazoo, Mich. Mr. Kittel was formerly field representative for the union in the New England area.

As Midwest director Mr. Kittel is in charge of union activities in Michigan, Illinois, Indiana, Iowa, Kansas, Missouri, and Ohio. He succeeds John W. Bailey, who will continue as third vice president of the union and will serve as a consultant to Kittel.

Davenport Newsprint Corp., Davenport, Iowa, has filed articles of incorporation with the secretary of state. The firm is capitalized at $150,000 to deal in newsprint, paper supplies. Lee P. Loomis, Mason City, is president of the company.

Hammermill Paper Co., Erie, Pa., has reached a new wage agreement with Local 620, International Brotherhood of Papermakers, AFL. Although the contract calls for increases amounting to 11 cents an hour plus special compensation boosts, all but a little more than 1 cent of the increase is subject to WSB approval. Special adjustments for certain maintenance employes are also provided. Workers will continue to be allowed six holidays a year, but will receive two-and-one-half times

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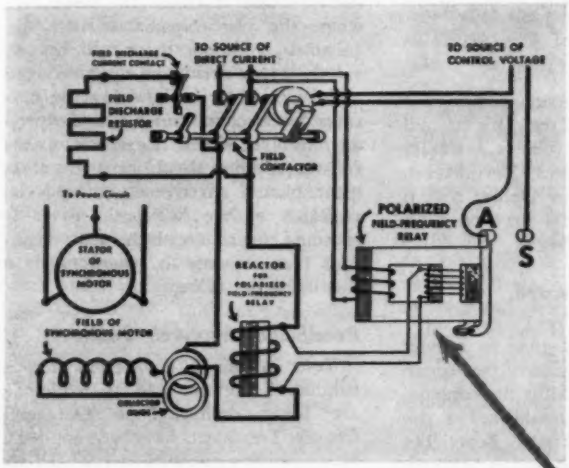

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Minnesota & Ontario Paper Co.,

International Falls, Minn., and nine AFL unions have reached an agreement calling for a two-cent per hour wage increase for four AFL locals at the strike-bound MANDO plant. The contract provides for application to the Wage Stabilization Board for additional wage boosts for the remaining locals. Meanwhile, the plant was still closed by a strike of 1,200 members of Local 33, International Woodworkers of America, who walked out during August because of dissatisfaction over a wage agreement reached in May.

Fulton Bag & Cotton Mills,

Minneapolis, has signed a new contract with the CIO textile workers to end a 10-month strike. The settlement gives the approximately 50 employes the 10 per cent wage increase permissible under WSB regulations. The contract is to run to April 1, 1952.

St. Regis Paper Co.

has resumed full-scale operations at its construction project near Pensacola, Fla., after the return of 62 AFL iron workers to their jobs.

Crane & Co.,

Dalton, Mass., has granted employes at its Dalton mill a two-cent an hour wage increase. Two cents is the maximum increase allowed under the Wage Stabilization Board formula. The firm has announced that the WSB has been petitioned to allow a third week's paid vacation for employes with service of 15 years or more.

Byron Weston Co.,

Dalton, Mass., has announced a two-cent an hour wage increase for its mill employes. The boost follows a similar pay raise granted union mill workers in the Holyoke area. The Dalton mill is non-union, but workers' pay rates usually follow union scale.

Fred C. Boyce Award Established

To encourage more students to enter the pulp and paper industry the American Pulp and Paper Mills Superintendents Association has established a student award honoring Fred C. Boyce. The schools in which the award is being established are the University of Maine, Orono; State University of New York, College of Forestry, Syracuse, and Western Michigan College, Kalamazoo. Award winners are to be chosen annually from among juniors in each of the schools and will receive a cash gift of $200.

Wisconsin Sulphite Pollution Research Continues

Research in the utilization of spent sulphite liquor in an effort to reduce stream pollution continues on a large scale in Wisconsin, where experimentation is centered at the headquarters of the Sulphite Pulp Manufacturers' Research League in Appleton. The League's pilot plant, together with member mills throughout the state, has been conducting research on the problem for several years.

Scientists Gather at Appleton

Pulp and paper industry scientists from 17 foreign countries met recently at the Institute of Paper Chemistry in Appleton to discuss sulphite waste disposal methods. This International Pulp and Paper Symposium was jointly sponsored by the United Nations Food and Agriculture Organization, the National Research Council, and TAPPI. (See page 768.)

One of the highlights of the week-long conference was a panel discussion on the subject, "What Shall We Do With Spent Sulphite Liquor," which was to be presided over by Dean Harry F. Lewis of the Institute. Panel members and their specialties were listed as: Oyvind Bryde, Norway, Scandinavian developments; Heinz Haas, Germany, production of yeast, alcohol, and tanning materials; Charles A. Sankey, Canada, alcohol; William Herriott, Neenah, Wis., roadbinder; Jesse M. Holderby, Rhinelander, feed yeast; Warren Lemke, New York, N.Y., chemical by-products; Irwin Pearl, Appleton, organic derivatives; Curt Rosenblad, Princeton, N.J., evaporation and burning, and J. Richter Salvesen, Rothschild, Wis., vanillin and other Howard process derivatives.

New Addition for Rhinelander Plant

Lake States Yeast Corp. is constructing an addition to its experimental spent liquor treatment plant in Rhinelander in an effort to make the torula yeast process more effective in reducing sulphite pollution. The original $500,000 plant was built three years ago by Wisconsin and Michigan paper companies adjacent to the sulphite pulp mill of Rhinelander Paper Co., which now operates it.

The new addition will house a unit to remove dissolved gases from the spent liquor before it enters the large tank where the yeast organisms are propagated. In addition, space will be provided for new circulation equipment that will be used for maintaining the most favorable temperatures inside the propagating tank. If this research is successful, the addition should boost the treatment plant's effectiveness in reducing pollution of the Wisconsin River by speeding the action of the yeast organisms that consume the wood sugars in this industrial effluent.

Roadbinder Research Continues

Tests on four different types of spent sulphite liquor for use as roadbinder are being conducted in Outagamie County. Treatments have been applied to four adjoining stretches of road, all sections being of practically identical construction and surface. Research engineers will study the results produced by normal traffic.

Rhinelander Paper Co. contributed effluent from its torula yeast plant; Marathon Corp. provided effluent from its chemical division plant at Rothschild, where liquor is treated by the Howard process; Consolidated Water Power & Paper Co. supplied liquor from the ammonium base process of sulphite pulping that is now being tested at its Wisconsin Rapids mill, and Kimberly-Clark Corp. sent sulphite liquor from the conventional calcium base process used at its Kimberly mill. Kimberly-Clark also donated use of its roadbinder trucks to spread the material.

Sulphite Waste Liquor as Fertilizer

Examination of successive years' crops on a farm field that was heavily fertilized three years ago with sulphite waste liquor indicates that the material may have substantial value in improving some crop yields. The roadbinder was applied in the fall of 1948 to experimental strips on a farm field in Price County. Flambeau Paper Mill spread the liquor at varying rates of application, ranging from five tons per acre to 35 tons per acre of the dry solids contained in the liquor.

After the material was applied the field was plowed, planted in oats and seeded down with clover and grasses. The oat field in 1949 showed a better color where the liquor had been applied most heavily, but threshing tests showed only a slight advantage for the treated strips. In 1950, without further atten-

tion, the field came up to clover and grass. Results in 1951, with the field still left uncultivated, show the differences fading but still noticeable. Considerably more clover remains in the treated strips than elsewhere.

Test Sulphite Liquor Burning Methods

Experts in the art of burning spent sulphite liquor gathered in Appleton recently for one of the most exhaustive tests of this industrial fuel ever made. The technical men who attended from throughout the country focused their attention on the furnace recently installed at the power plant of the Interlake Mill of Consolidated Water Power & Paper Co. The furnace is a tunnel type in vertical position, designed so that fuel, flame, and inrushing air circulate in cyclone fashion. The mill has been operating the unit intermittently. Continuous operation has been impossible because of short fuel supply. Among technicians attending were crews from Babcock & Wilcox Co. and General American Transportation Corp.

Ceilings for Kraft and Sulphite Discussed

A ceiling price regulation for sulphite and bleached kraft papers was discussed recently by members of an industry advisory committee meeting with OPS officials. The regulation would set dollars-and-cents ceilings for key items, with other ceilings to be figured by using customary differentials. It is reported that the ceilings would be established at the level of or higher than those set for the bulk of production under C. P. R. 22, the general manufacturers' price order.

Dollar-and-Cent Ceiling Asked for Box and Containerboard

At a recent meeting with OPS officials in Washington, D.C., members of the industry advisory subcommittee proposed a dollar-and-cent ceiling price regulation for the boxboard and containerboard industry. The subcommittee made detailed recommendations on provisions of the proposed order.

The regulation would provide ceiling prices on key grades and weights of boxboard and containerboard and specify differentials to be employed in pricing other weights and grades and also variations in finish, trim, packaging, and volume of sales.

Fibre Drum Industry Asks Ceiling Price Formula

Members of the Fibre Drum Industry Advisory Committee at a recent meeting with OPS officials recommended that their industry be included in the coverage of a tailored regulation for converted paperboard and fibreboard products. Under the proposal manufacturers would employ as their ceilings prices in effect during a specified period.

Manufacturers who sell by formula instead of price lists would use the formula they employed in the base period and apply their base period margins to the various costs. Committeemen indicated that the period from January 25 to February 24, 1951, would be satisfactory.

New Operating Organization Announced by Ecusta

Formation of a new operating organization for Ecusta Paper Corp., Pisgah Forest, N. C., was announced recently along with the appointment of executive personnel to administer the firm's two new divisions. Ecusta is a subsidiary of Olin Industries, Inc.

John Wesley Haines, Olin vice president and president of Ecusta, who will be in charge of the new operating divisions, announced that Norman H. Collisson had been appointed general manager of the Olin Cellophane Div. Mr. Collisson is a Ecusta vice president. At the same time Lawrence F. Dixon was made general manager of the Ecusta Paper Div.

Olin Cellophane Div. executives are to be: Milton L. Herzog, production manager; James L. Spencer, sales manager; E. Hartshorne, research and development manager, and E. L. Lynn, quality control manager.

Executives of the Ecusta Paper Div. are: Lee M. Bauer, production manager; R. E. Matthews, sales manager; Milton O. Schur, research and development manager, and R. L. Hooper, quality control manager.

KVP Reorganizes Sales Staff

A reorganization of the home office sales staff to provide a more efficient grouping of responsibilities has been announced by Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich. The new plan, according to C. F. Christy, vice president in charge of sales, makes it possible for key men in the sales division to become more familiar with overall sales operations.

In the reorganization eight men acquired new titles. Named director of sales promotion and planning was James Southon. W. Donald Brownell became director of the home office sales staff, while Merle Wood was made director of field sales. Alfred Weston took the position of general sales manager of product packaging, and Clinton Sherman became general sales manager of KVP stock papers.

Reginald Hills and Theodore Meninga were named divisional sales managers, and Franklyn Shire appears on the organization chart as supervisor of creative artists. The latter appointment was designed to provide closer working relations between the art department and the sales organization.

Pulp and Paper World Report

Paper continues in critical short supply throughout the world. The last half century has seen a sharp upswing in consumption, notably in the United States, while an increase in production has not been able to maintain pace with the demand. In 1900, American per capita consumption was about 60 pounds annually. By 1939 it had grown to 244 pounds and currently is estimated at more than 400 pounds.

Major shortages in the industry are found in newsprint and kraft stock, which continue to be in strong demand throughout the world. In the U.S. the continuing newsprint shortage has been blamed on government plans to allot this commodity to European countries. Reported to be improving, though still not plentiful, is the supply of paper bags. This is due in large part to the expansion of facilities for making kraft stock that has been planned by southern producers, with late 1952 set as the date for full production.

The shortage in all types of paperboard containers shows indications of improvement. In addition to the forecast increase in production of kraft stock, mixed paper prices in Chicago have dropped sharply from the high of $31.50 per ton last December. Quoted prices are currently approximately $15. Prior to the start of the Korean War prices were about $10 a ton in Chicago.

Paper prices, like all others, have responded to sharp demand. Since 1939 prices have jumped 80 to 100 per cent. For example, 10-pound grocery bags that sold for $2 a thousand in 1939 now are $4 to $5. Newsprint, which sold at $50 a ton in 1939, is currently quoted at about $116 in the open market. It brought $40 in 1935.

United States consumption has increased from an annual 2,000,000 tons in 1900 to a current 30,000,000. These figures include newsprint. Production of all types of paper in the U. S. this year has been estimated at 26,000,000 tons.

Canada

Greater demand in Canada has resulted in efforts on the part of manufacturers to increase production in every possible way. Pulpwood cutting has

shown a tendency toward a year-round basis, and there are already instances of night cutting. A longer cutting season, it is hoped, will lead to a reduction in turn-over of woods' personnel and greater productivity.

Virtually all types of paper have continued in tight supply. One mill producing a full range of papers (with the exception of newsprint) reported in May that it had accumulated an order backlog of 20,000 tons as against its capacity of 1,500 tons weekly. The first six months of this year saw a strong demand for fine papers of all types. Although wrapping papers are being produced at ever increasing rates, there is still a shortage due to requirements in the defense industries.

Demand for all grades of paperboard has resulted in an estimated 1950 production of 705,000 tons, an increase of 58,000 tons over 1949. Production of container grades in 1950 was reported at about 352,000 tons, an 11 per cent increase over 1949, and all other grades approximated 353,000 tons, up 6.9 per cent.

In the newsprint field it has been estimated that Canadian production in 1951 may be as high as 5,465,000 tons. This estimate, however, depends on certain factors: maintenance of an adequate supply of raw materials (particularly sulphur), sufficient labor in the face of possible mobilization, and availability of plant equipment.

Canada has reported a postwar shift in newsprint export, with increased shipments to the United States and a corresponding decrease in shipments to other countries. During the period 1946-50 the U. S. was adding an average of slightly more than 1,500,000 tons a year to its consumption, with Canada supplying 1,750,000 tons more than before the war. A spokesman for the Newsprint Association of Canada has predicted that in 1951 the U. S. will receive about 4,800,000 tons from Canada, or 65,000 tons more than in 1950.

Mexico

Another step in the program to ease the already severe newsprint shortage was the announcement that a cellulose factory is to be constructed in the vicinity of Tlacotalpan, in the state of Veracruz. Planned for the production of newsprint and other papers, the plant is expected to supply Mexican needs.

The project, according to reports, will be financed by both Mexican and foreign capital. It will be erected under the supervision of European technicians, some of whom have already arrived in Veracruz on an inspection tour.

Chemists in Mexico have recently been investigating the possibilities of rhizome roots as a source of cellulose. European experiments have been watched, and it is believed that the plant can be grown in the Mexican climate without difficulty. In the event that experiments with rhizome prove a failure, the government plans to continue its research with the camalote plant.

Colombia

As elsewhere in the world, newsprint has become an acute problem in Colombia. All leading daily newspapers have been forced to reduce their number of pages and cut down on strips, Saturday reviews, and literary supplements. Smaller dailies and weeklies have not been affected.

Cuba

Consumption of pulp and paper, and paper products in Cuba during 1950 was greater than in 1949, and the demand is steadily increasing. The rising demand has turned the buyer's market existing during the early part of this year into a seller's market. The shortage of pulp is due to the fact that during 1950 a sharp increase in production was announced by Cuba's two paper mills—a 17 per cent increase in paper and a 53 per cent increase in paperboard. The country's only manufacturer of rayon yarn and fibre increased production during the same period by 218 per cent.

Finland

Latest figures show an increase in production of wood pulp. In 1949 the country produced 1,613,225 metric tons, while in 1950 the figure was 1,913,084. Sulphite increased from 625,950 metric tons to 717,376; sulphate from 389,075 to 476,308; groundwood from 598,200 to 719,400. Production of all types of paper increased from 564,800 metric tons in 1949 to 632,700 in 1950. Board jumped from 104,000 tons to 136,000 tons in the same period.

Norway

A proposal to nationalize the pulp and paper industry was to be an item on the agenda of the annual conference of the Pulp and Paper Workers Union scheduled for October. However, industry sources report that the threat is not a serious one at present. The prime minister has stated that the government would not press for the nationalization of such an important industry unless the people vote to approve the move in a national election.

Denmark

Danish paper manufacturers have cautiously reduced operations and expansion plans because of increasingly high prices and a competitive demand in the Scandinavian pulp market that has restricted the flow of supplies. Some pulp supplies are available at higher-than-market prices, but the industry has hesitated to risk paper production at dangerous cost levels. In spite of reduced operations, paper and paperboard production in 1950 totaled about 105,000 metric tons, an increase of approximately 8 per cent over 1949. Unless the pulp supply improves, indications are that 1951 production will probably not exceed 90 per cent of capacity. However, even at 90 per cent output can be maintained at the 1950 level.

United Kingdom

In July the price of practically every class of home-produced papers rose sharply. Esparato papers increased by £5 a ton; wood free papers by £8; machine glazed poster papers by £10; machine-glazed envelope paper by £15; machine-glazed unbleached sulphite by £20, and banks and bonds by a penny a pound. Generally, imported material costs were unchanged, indicating that rising home production and transportation costs caused the price increases.

Italy

Authorization to import book paper valued at $92,000 from Russia was recently granted to the son of the president of Italy. This is the third such authorization for paper since the end of the war. The first two, in 1948 and 1950, were for newsprint.

Union of South Africa

Certain industrial and financial interests in Johannesburg are reported to be considering the construction of a paper mill in the Eastern Transvaal. Present plans forecast an output of about 20,000 short tons of newsprint in 1955, the first year of production. The final capacity aim is believed to be 40,000 tons. The mill is to be privately controlled, but the Newspaper Press Union has guaranteed to take all tonnage produced.

Gold Coast

Local publishers in the British Gold Coast of Africa are experiencing increasing difficulty in obtaining newsprint from the United Kingdom. At least two new daily newspapers, which had planned to begin operations in May and June, were forced to delay publication because of the shortage.

Tunisia

The import duty on specified types of paper has been temporarily suspended by the Tunisian government. In an order dated July 6, duties were lifted from crystal paper, greaseproof paper, sulphurated paper, and cardboard in rolls and/or sheets.

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Insul-Mastic coatings are sprayed just as they come from the drums.

SPRAY APPLICATION

No specialized application methods are needed for Insul-Mastic coatings.

NO HARM TO WORKMEN

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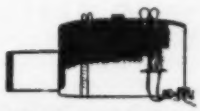

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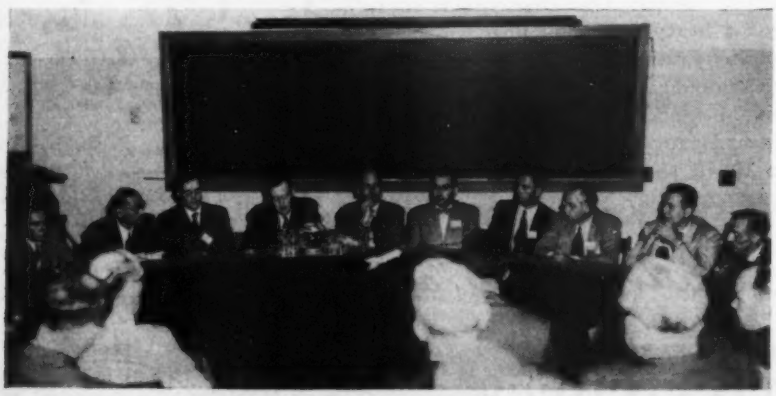
FOREIGN DELEGATES to the Symposium gather during the five-day meeting. In the front row fourth from left is Dr. Harry F. Lewis, dean of the Institute. Dr. Emil Heuser, retired professor at the Institute and winner of the 1948 TAPPI medal, is in the front row center.

World Scientists Discuss Technical Problems at Wisconsin Meeting

Eminent scientists and pulp and paper technologists from 17 foreign countries and the United States attended the International Pulp and Paper Symposium held at the Institute of Paper Chemistry, Appleton, Wis., September 17-21. The meeting was sponored jointly by the wood chemistry subcommittee of the United Nations Food and Agriculture Organization (FAO), the committee on the chemistry of plant products of the National Research Council, and the fundamental research committee of TAPPI.

Open technical sessions were held by the FAO wood chemistry subcommittee on the topics, "Tropical Woods as a Source of Pulp" and "Chemical Utilization of Agricultural Residues." The principal sessions of the Symposium were opened on the first day by Dr. Harry F. Lewis, dean of the Institute, who introduced Dr. Herman Mark of the Brooklyn Polytechnic Institute, chairman of the FAO subcommittee.

Chairmen of the various sessions were Dr. W. G. Campbell of the Forest Products Research Laboratory, Princes Risborough, England; Dr. J. Alfred Hall, director of the U. S. Forest Products Laboratory; Dr. J. E. Atchison of the pulp and paper branch, Economic Cooperation Administration, Washington, D.C.; Dr. Herman Mark; Prof. Clifford B. Purves, McGill University, Montreal; Dr. Emil Heuser, emeritized by the Institute; and Dr. Harry F. Lewis.



SULPHITE PROBLEMS are discussed at one of the many roundtables staged during the Symposium. Seated at the table (l to r) are William Herriott, Kimberly-Clark; Dr. Heinz Haas, Germany; Dr. Oyvind Bryde, Norway; Jesse Holderby, Lake States Yeast Corp.; Dr. Harry Lewis, dean of the Institute; Dr. I. A. Pearl; Curt Rosenblad, Rosenblad Corp.; Dr. J. R. Salvesen, Marathon Corp.; Warren Lemke, International Paper Co., and C. A. Sankey, Ontario Paper Co.

Technical Papers Cover Wide Range

Morning and afternoon sessions of the meeting were devoted to technical papers by world-famed technologists and scientists, in addition to special roundtable discussions in which experts in various fields participated. A total of 25 individual papers were presented.

Leading off the technical sessions was Dr. W. E. Cohen of the Commonwealth Scientific and Industrial Research Organization, South Melbourne, Australia, who spoke on "Species Sampling on a Reproducible Basis." He stressed the importance of the sampling and procurement of sufficient material to cover an entire series of analyses, stating that the fines ordinarily lost in the usual milling and screening operations often contain important constituents of the wood out of proportion to their actual bulk and should therefore be included in all analyses. Dr. Cohen's paper was followed by one on "Tropical Wood Distribution and Forestry Practice" by Robert W. Hess, Mengel Co., Louisville. Expressing the opinion that the best future source of pulpwood is in plantation growth, Mr. Hess said that in most tropical forests the heterogeneity of species in a given area precludes logging of a single species, hence logging of mixed woods becomes imperative.

Dr. Frederick Wangaard, Yale University School of Forestry, and Dr. Louis E. Wise of the Institute discussed "Physical and Chemical Characteristics of Tropical Woods." According to the papers, a principal difference between temperate and tropical woods is the greater specific gravity of many tropical species, which prevents flotation to the mills. In this general area of discussion was a paper by Dr. Irving H. Isenberg of the Institute on "Morphology and Fiber Measurements of Tropical Wood Fibers."

Dr. L. Rys, Industrias Klabin do Parana de Cellulose, Monte Alegre, Brazil, in a paper entitled "Influence of Chipping on Parana Pine Sulfite Pulp," noted the marked differences in chemical and physical properties of the pulp from wood chipped by hand and that chipped by machine. Machine chippers caused shortened fibers, raised the fines, lowered the pulp viscosity, reduced

strength values of pulp sheets, and did not produce as strong a pulp as hand chippers.

The need for new raw material was stressed by Dr. R. Peteri, chief of the research department, Regie Industrielle de la Cellulose Coloniale, Paris, in his paper, "Pulping Studies with African Tropical Woods." He described the operation of an African pilot plant which has pulped a mixture of woods with good results. Data on the pulping of Greenheart and Wallaba from British Guiana was given by Dr. H. E. Coomber of the Colonial Products Advisory Bureau in South Kensington, England, in a paper, "Pulping Studies with Colonial Tropical Hardwoods as Papermaking Materials."

"Viscose Rayon Pulps from Chilean Coigue, Tepa, and Ulmo," a paper by F. A. Simmonds and R. M. Kingsbury, Forest Products Laboratory, Madison, revealed that all experimental pulps are chemically satisfactory for continuous-thread rayon. Such pulps could be produced by (1) the neutral sulphite semichemical process, (2) the prehydrolysis-sulphate process, or (3) the sulphite process in conjunction with suitable purification treatments.

Other papers in the opening session included "Chemical Pulps from Australian Eucalyptus" by Dr. A. Meller of Australia and "Chemical Utilization of Tropical Hardwoods" by Dr. R. H. Farmer and W. G. Campbell of the Forest Products Research Laboratory in England.

Under the general heading "Chemical Utilization of Agricultural Residues," a series of papers was presented dealing with the use of straw and bagasse for papermaking. Among those debating the usefulness of these materials in papermaking were Dr. E. C. Lathrop of the Northern Regional Research Laboratory in Peoria, Ill., who expressed the opinion that straw could be used advantageously, and Dr. L. G. S. Hebbs of Great Britain, who said that the trial given straw in England during the war proved it unsuitable for large-scale commercial use. Tuesday's sessions were concluded with a general discussion on the possibility of establishing FAO standard methods in the fields of wood chemistry and pulp and paper. R. G. Macdonald, secretary of TAPPI, led the discussion.

Papers presented Wednesday morning included "The Cause of the Reddening of Pulps and its Technical Significance" by Dr. E. Adler of Sweden; "Dynamic Measurements of the Physical Properties of Pulp and Paper by Audio-Frequency" by Prof. Masao Horio, Kyoto, Japan; "The Chemical Composition of Fiber Fractions from Nonbeaten and Beaten Fiber Materials" by Dr. Oyvind Bryde of Norway, and "The Cause of Foaming of Green Groundwood" by Dr. J. W. Green of the Institute.

Dr. E. Hagglund of the Swedish Forest Products Research Laboratory spoke on "Technical Problems Involved in the Evaporation and Utilization of Sulphite Spent Liquor." Due to the large amount of steam required to evaporate the rather dilute spent liquor prior to burning, other methods for its utilization were investigated. One of these is the re-cycling method, which proved feasible and through which up to 50 per cent of the liquor could be re-cycled provided the maximum temperature was not over 240F. The re-cycling process reduced the amount of water to be evaporated by about one-half.

On Thursday, Dr. J. K. N. Jones of the University of Bristol, England, spoke on "The Isolation and Identification of Sugars Present in the Hemicellulose of Wood or Pulp." Dr. Paul Lange of Sweden discussed "The Distribution of Cellulose and Hemicellulose in the Cell Wall of Sulfite and Sulfate Pulps." Dr. Heinz Haas, Mannheim, Germany, spoke on "The Characteristics of a Wood Pulp for Viscose Manufacture." He said that the ease or difficulty in dissolution of the wood fibers concerned the presence of wood polyoses in the outer layer of the cell wall. Their presence prevents the fibers from reacting uniformly during xyanthogenation. "Natural and Artificial Lignin" was discussed by Dr. Karl Freudenberg of the University of Heidelberg, Germany, who compared the similarities between natural lignin formation and synthesis of lignin-like substances in the plant.

A panel discussion on "What Shall We Do with Spent Sulphite Liquor" brought together such men as Jesse M. Holderby, Lake States Yeast Corp.; Warren Lemke, International Paper Co.; Dr. J. R. Salvesen, Marathon Corp.; Dr. Irwin Pearl of the Institute; Dr. William Herriott, Kimberly-Clark Corp.; Curt Rosenblad, Rosenblad Corp.; and representatives from Norway, Germany, and Canada. It was pointed out that economic reasons are only partially responsible for the desire to utilize spent liquor, since there is legislation prohibiting emptying it into streams in some areas. Dr. Haas spoke of the production of alcohol and yeast in Germany, Dr. Salvesen described Marathon's production of vanillin, and Dr. Herriott told of the use of the liquor as roadbinder. Several conclusions were drawn: the use of spent sulphite liquor as roadbinder and fertilizer has possibilities; it is limited by its seasonal nature; yeast production is a possibility.

"Pilot Planting for the Paper Industry" was discussed in the second panel. Participating were Dr. Karl Adamik, Institute of Wood Chemistry, Graz; G. H. Chidester, U. S. Forest Products Laboratory; Rodger M. Dorland, Abitibi Power and Paper Co. Ltd.; John S. Hart, Pulp and Paper Research Institute of Canada; Dr. W. F. Holzer, Crown-Zellerbach Corp.; D. J. MacLaurin, the Institute, and Dr. Borje Steenberg, Swedish Forest Products Research Laboratory. Dr. Holzer described a new pilot plant being built by Crown-Zellerbach and stressed that its size had to be such that the ratio of pilot plant scale to major production scale would be no greater than 1:5.

On Friday the Symposium was divided into groups. The pulp and paper men discussed common problems, while the wood chemists heard a series of papers by outstanding technical men. Dr. W. G. Campbell spoke on "Acid-Soluble Lignin," in which he noted that the present lignin determination leads to values in error of as much as 25 per cent. Other papers were by Dr. A. B. Anderson, University of California, and Dr. G. F. Davidson of the Shirley Institute, Manchester, England.

The sessions were closed with a banquet, at which the principal speaker was Ernst Mahler of Kimberly-Clark Corp.

Waste Paper Prices Weak to Steady

Prices on the Chicago waste paper market continued weak to steady during September. Mills in the Midwest are reported to have stopped buying in quantity because of high inventories and low demand. However, export movements are good in such grades as old corrugated, news, mixed and kraft.

Old corrugated cartons slipped $2 a ton September 17 on the Chicago market as mills dropped buying quotations to $28 a ton. Mixed paper at $15 and news at $18 were holding steady. Representative prices in dollars per hundredweight at Chicago during the third week of September were as follows: folded-news, .30 @ .40; old containers, .75 @ .80; books and magazines, 1.00 @ 1.25; brown kraft, 1.00 @ 1.25; white news blanks, 1.40 @ 1.50; miscellaneous hard white shavings, 5.00 @ 5.75.

Custom Court Cases

A decision of the United States Customs Court has held that test liner from Finland shipped shortly after the close of World War II was undervalued in the amount of approximately 25 per cent. The case involved several thousand tons valued at about $600,000. The issue had been before the court for several years.

Among new cases filed recently by importers in Customs Court are the follow-

ing: Toilet rolls from Canada imported at Ranier, Minn., classified for duty at 35 per cent as manufactures of paper and claimed to be dutiable at the lower rate for tissue paper; paper napkins from Norway, classified for duty at New York, N.Y., as manufactures of paper and claimed to be dutiable at the lower rate for paper cut into shapes; gypsum lath from Ireland, imported at Tampa, Fla., classified as laminated paperboard, claimed to be dutiable at the rate for plain paperboard; two shipments of Finnish sulphite wrapping paper held by New York, N.Y., appraisers to have been undervalued.

Other problems now before the customs officials involve the following: Tag board from Canada claimed to be dutiable at the lower rate for printing paper; shoe board from Canada claimed to be dutiable at the lower rate for fibre board; ruled cards from Canada, claimed to be dutiable as manufactures of paper, believed to be dutiable as bristol; cut-out artistic designs, claimed to be dutiable as paper cut into shapes, believed to be dutiable as articles of metal coated paper; waxed crepe paper imported at Buffalo from Canada being studied to determine whether it is dutiable as creped paper or at the lower rate for waxed paper, and imports of Finnish paperboard at New York, N.Y., and Boston under investigation for possible undervaluation.

Crossett Debarks Sawlogs—Clean Slabs used for Pulp

The equivalent of 14,000 cords of pulpwood will be saved each year through a plan recently announced by the Crossett Companies, Crossett, Ark. This conservation move, to be accomplished through the debarking of all logs entering company mills, is the first such program to be used in the South.

By removing the bark from the logs before they are sawn, slabs that were previously useless in papermaking will be utilized. The plan introduced by Crossett came after company officials had made an extensive inspection of similar facilities in the Pacific Northwest. According to a spokesman for the firm, the slabs, which are now being used as fuel in the sawmill steam plant, will become raw material for conversion into kraft paper.

Experiments to Reduce Paper Mill Odors

Scientific experiments now being conducted in British Columbia may result in substantially reducing objectionable odors caused by kraft mill operations. The program is under the direction of the provincial Research Council.

Dr. S. E. Maddigan of the Council reported recently that the research on the oxidation of "black liquor" produced by the mills promises to remedy the problem at least in part. A semi-pilot test mill at Port Alberni, he said, has shown elimination of 90 to 100 per cent of odorous materials.

In making the announcement, Dr. Maddigan disclosed that another important research success has been the production of fuel gas from wood waste. A process has been developed by which gas is produced from 200 pounds of dry wood at an estimated cost of 29 cents. Oil of equal heat value would cost 39 cents.

Facts of Biological War Explained in New Film

The Federal Civil Defense Administration has released a film, "What You Should Know About Biological Warfare," which is to be made available to television stations throughout the country. The film is a kinescope recording of a TV program, the Johns Hopkins University Science Review, broadcast April 3 over the Dumont Network.

Citing the need for an educational campaign, the FCDA has warned that a smash attack can come without warning. The individual must be prepared, must know what he faces and what to do about it.

In the current educational program FCDA has announced a plan through the cooperation of the Atomic Energy Commission by which communities may borrow radiation detection equipment for use in training courses. The AEC has made available Beta-Gamma Geiger counters, Alpha-Beta-Gamma discriminating ionization chambers, and cobalt 60 sources.

C-Z Cone Harvest Now Underway

Crews under the direction of Crown-Zellerbach Corp. foresters are at work in the Columbia River area gathering cones in the company's annual harvest. The objective of the San Francisco firm is to secure between 3,000 and 4,000 pounds (500 to 600 million viable seeds) of selected, high quality seed for storage in the "seed bank" at freezing temperatures.

The harvest is being conducted on several C-Z tree farms. Cones being collected are from western red cedar, Sitka spruce, western hemlock, grand fir, noble fir, and Douglas fir. Currently, the company's seed bank contains less than a ton of forest seed, an inadequate amount for even one season's reforestation. Plans call for the use of helicopters in reforestation on between 2,000 and 3,000 acres before the first of the year, and for the early fall planting of some 200,000 two-year-old noble fir trees at high elevations on the Clackamas Tree Farm. Also in C-Z plans is the planting of 1,000,000 trees before the close of next spring's rainy season on farms in Tillamook, Clatsop, and Columbia counties in Oregon, and in Cowlitz, Wahkiakum, and Pacific Counties in Washington.

Industry Notes

Japanese Paper Exports
to the United States are increasing steadily, according to an announcement by Stevens Nelson Paper Co., New York, N.Y. Imports by U.S. buyers include about 40 different grades in three general categories: specialty printing papers, technical tissues, and wood veneer types. In releasing the trade figures, Stevens Nelson noted that Japanese paper producers are meeting problems similar to those now hampering American production, including rising prices and costs and shortages of raw materials.

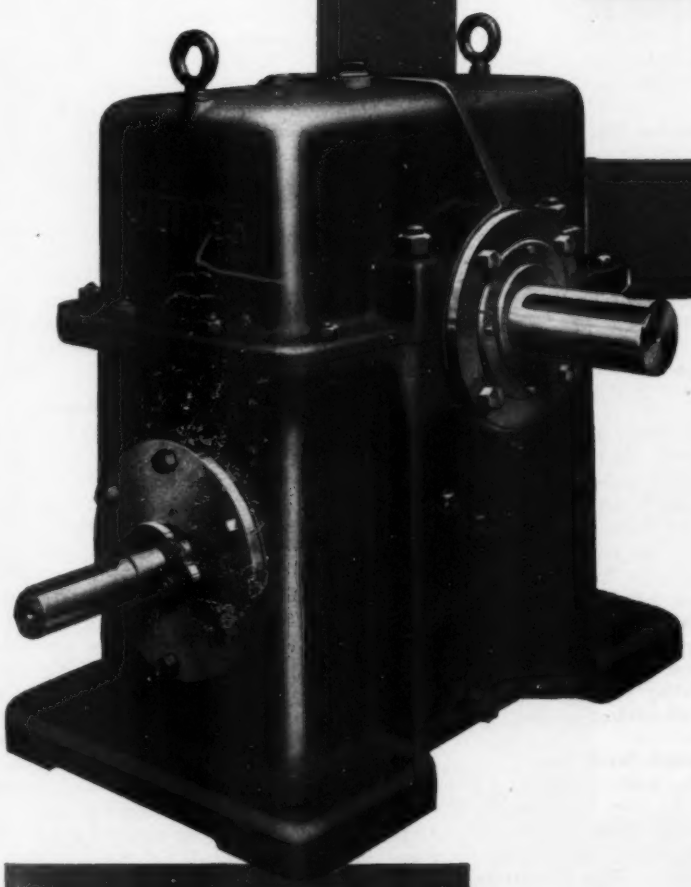
Seven Southern States
in 1947 produced two-thirds of the United States total cut of gum and half of the southern yellow pine. The report was issued recently by the Southern Forest Experiment Station of the U.S. Forest Service in New Orleans, La. The states involved were Alabama, Arkansas, Louisiana, Mississippi, Oklahoma, Tennessee, and Texas. This general area also cut 40 per cent of the oak and cypress and more than 25 per cent of the ash, beech, cottonwood, elm, hickory, and yellow poplar.

Hammermill Paper Co.,
Erie, Pa., recently staged a chain saw preventive maintenance school at its main offices. The firm's pulpwood suppliers and chain saw operators in a three-state area attended the classes, which were under the direction of H. H. Jefferson, training officer of the American Pulpwood Association. Subjects considered in addition to preventive maintenance included safety in operation, chain filing, both mechanical and manual.

One Million Paper Cups
and containers are being stockpiled at three Minnesota cities for use during possible air attack or any large-scale disaster. The importance of the containers, ranging from 1 oz. medicine cups to 16 oz. soup and stew cups, was emphasized recently by Col. E. B. Miller, state director of civil defense, who pointed out that the containers would be of special importance in the event of the disruption of water supplies. The cities

Jones

WORM GEAR SPEED REDUCERS



A right angle unit built for heavy duty performance in any industry. The worm can be above or below the gear. Shafts single or double extended for coupling connections or chain or gear drives.
They are built in ratios from 4 to 1 to 90 to 1 and in capacities from ¼ to 100 H.P.
Bulletin No. 68 covers selection tables and dimensions.

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participating in the program are Minneapolis, St. Paul, and Duluth. Arrangements are being made by the Paper Cup and Container Institute, Inc.

130 Minnesota Loggers
have been granted extended timber leases. In issuing the renewal the state auditor warned that lease renewals will not be given in the future except under extraordinary circumstances. The leases cover various state-owned timberlands and are issued once each year. According to a spokesman for the state, some firms have renewed permits seven or eight times without cutting trees.

A $500,000 Fire
recently gutted two large newsprint warehouses in Alexandria, Va. The buildings were owned by Robinson Terminal Warehouse Corp., which supplies newsprint to the Alexandria *Gazette*, the Washington *Post*, the Washington *Times-Herald*, and the Washington *News*.

Constantine Board & Paper Co.,
Constantine, Mich., will regain operating control of its Constantine paper mill at the end of the year. The mill has been leased to American Can Co. since 1923. The action was taken by American Can in line with its policy of concentrating on the manufacture of cans and fibre containers. However, the firm will continue to purchase paper and packaging material from the Constantine mill. Fred G. Wier and Robert T. Wier Jr., sons of the founder, will manage the plant.

Minnesota & Ontario Paper Co.
has announced that the 1951 - 52 MANDO graduate research fellowship in forestry has been awarded to Roland E. Schoenike, a 1951 graduate of the University of Minnesota School of Forestry. The fellowship was established at the university in 1946. This year's study will be devoted to reproduction on recently cutover state and private lands and the regeneration status of uncut black spruce swamps.

Union Bag & Paper Corp.
has announced the sale of a 195-acre tract on the Trent River in Jacksonville, Fla., to the U.S. Navy. The land is to be used for the expansion of a bulk petroleum terminal. The property was originally purchased by Union Bag for the construction of a pulp mill, but these plans were abandoned when the firm expanded its Savannah facilities.

KVP Co. Honored Retired
maintenance department employes at a recent banquet in the Hotel Harris, Kalamazoo, Mich. About 150 persons attended. Fred Ter Burgh, head of the department, served as master of ceremonies.

$4,000,000 in Mine Props
have been purchased from St. Regis Paper Co. by the Federation of Belgian Coal Mines. Jacksonville, Fla., is to be the major port of shipment, with some cargoes to be handled through Mobile, Ala., Gulfport, Miss., and Pensacola, Fla.

Pacific Northwest Forest Industries,
Portland, Ore., recently reelected E. P. Stamm, logging manager for Crown Zellerbach Corp., as chairman of its forest conservation committee. Named vice chairman was Floyd Hart of Medford, Ore., a member of the state board of forestry. Harris E. Smith is secretary and W. D. Hagenstein forest engineer.

Four Paper Firms
have relocated their New York, N.Y., offices. The companies involved in the move to 655 Madison Ave. are Ashland Paper Mills, Inc., Bridgeport Paper Co., Inc., Warrensburg Pulp & Paper Corp., and White Washburne Co., Inc.

APW Products Co.,
Albany, N.Y., recently announced that increased sales have required the addition of 150 workers at its plant.

Northern Box Co.,
recently established in Elkhart, Ind., has announced the beginning of operations. The new firm has a staff of five men.

Duckett Paper Co.,
Champaign, Ill., was recently sold to Bernard Murphy and Mark Hughes. The new name of the firm is to be Murphy-Hughes, Inc. Besides dealing in wholesale paper products, the company sells janitor and dairy supplies.

Stanford Paper Co.,
Washington, D. C., has opened its new office and warehouse building at 3001 V St., N. E. About 1,400 guests attended the house warming party sponsored by the firm September 3. The building is 217 feet by 175 feet, including truck bays and loading platform. The area is 45,000 square feet, including 7,500 in the second floor offices and penthouse. All paper storage is palletized (wood pallets or platforms) to permit mechanical handling throughout.

Hammermill Paper Co.,
Erie, Pa., recently staged its 38th conference for sales agents of the firm. A total of 185 paper merchant executives from throughout the United States attended the meetings. Conference speakers explained the new and more efficient production methods that the firm has instituted in recent years. Among the speakers was John D. Zink, vice president and director of merchandising, who reported as to general business conditions and outlook.

Celanese Unit Building New Canadian Chemical Plant

Construction is reported well underway on the $50,000,000 plant being built at Edmonton, Alberta, by Canadian Chemical Co. Ltd., a newly organized subsidiary of Celanese Corp. of America. Foundations and roads have been constructed, and construction buildings have been erected. Completion is expected in 18 months, with an estimated working force of 700 to be employed.

The firm will produce a variety of industrial organic chemicals by a process based on the oxidation of liquefied petroleum gases. In addition, staple fibre and filament yarn will be manufactured. Output of formaldehyde and pentaerythritol will be sufficient to meet domestic demand, with the balance to be used in export.

Butterworth Completes Plant Expansion

Plant expansion costing approximately $300,000 has been completed by H. W. Butterworth & Sons Co., Bethayers, Pa. A new building containing 68,000 square feet of floor space houses the pressed roll department and includes machinery for the manufacture of calender rolls for coated stock, super and glassine.

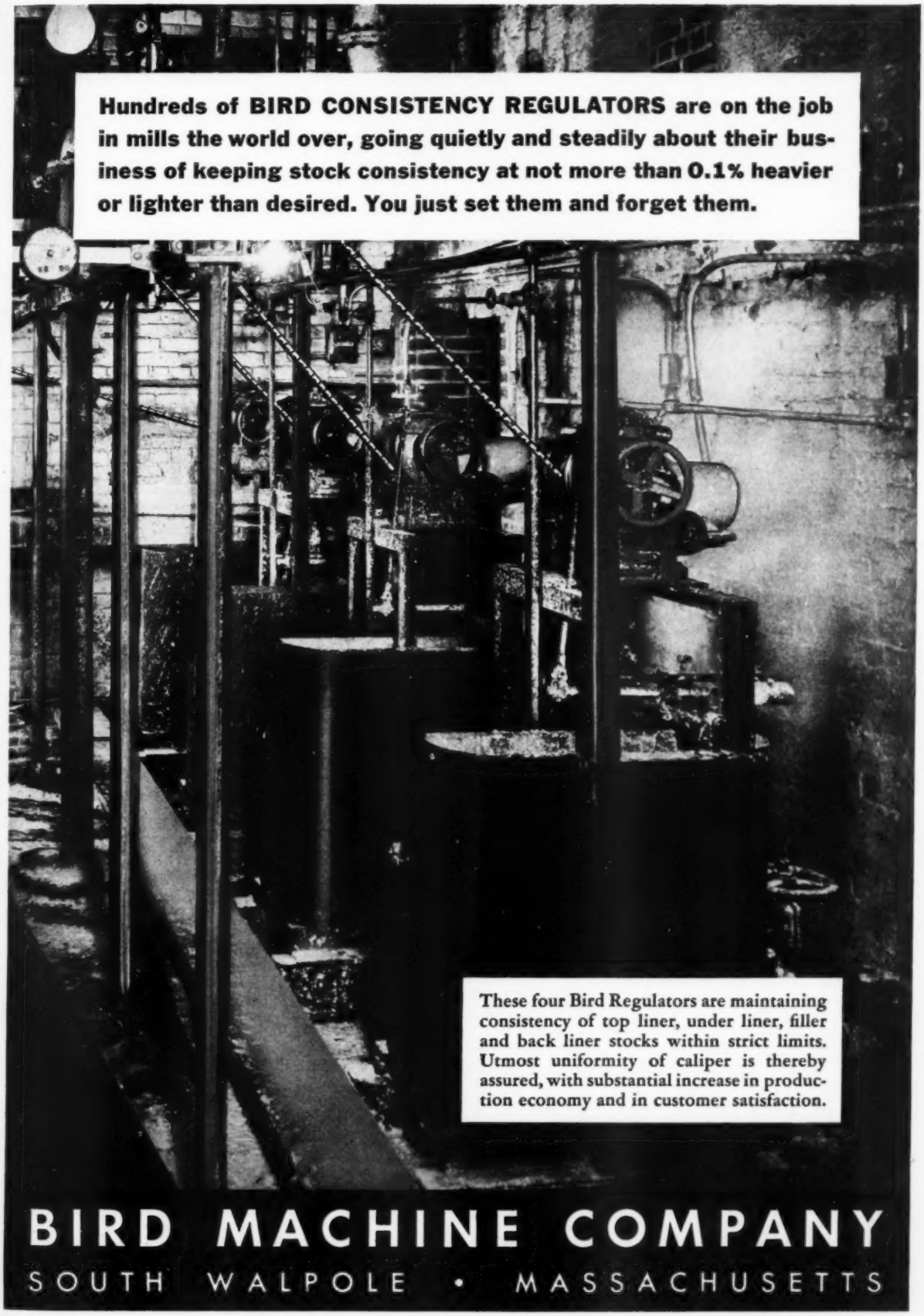
The new plant is the third step in a four-year expansion program. In 1947 the firm completed construction of a large machine shop at Bethayers, while in 1950 the company foundry was converted for manufacturing operations. With the latest addition, Butterworth production capacity is at the highest level in the firm's 130-year history.

Black-Clawson Sales Meeting

A tour through the recently expanded Fulton, N.Y., laboratory of Dilts Machine Works Div. highlighted a recent general sales meeting for Black-Clawson Co. personnel. Those attending, in addition to B-C and Dilts salesmen, included staff members of Shartle Bros. Machine Div., three Alexander Fleck representatives, and guests from Cowles Co.

The tour was conducted by Dilts laboratory technicians and research engineers. Experimental runs were made through the firm's 700-gallon Hydrapulper and Hydrafiner-Jordan system. Technicians in the wet lab and paper testing department demonstrated various testing equipment, making complete analysis of samples prepared in the laboratory system.

Most of those attending the Fulton meeting spent a day as guests of Cowles Co. at its laboratory at Cayuga, N.Y. They witnessed operation of the Cowles side drive pulper and the Cowles pulper-refiner. Edwin Cowles, president of the firm and inventor of the Hydrapulper, was host for the occasion.


Hundreds of BIRD CONSISTENCY REGULATORS are on the job in mills the world over, going quietly and steadily about their business of keeping stock consistency at not more than 0.1% heavier or lighter than desired. You just set them and forget them.
These four Bird Regulators are maintaining consistency of top liner, under liner, filler and back liner stocks within strict limits. Utmost uniformity of caliper is thereby assured, with substantial increase in production economy and in customer satisfaction.
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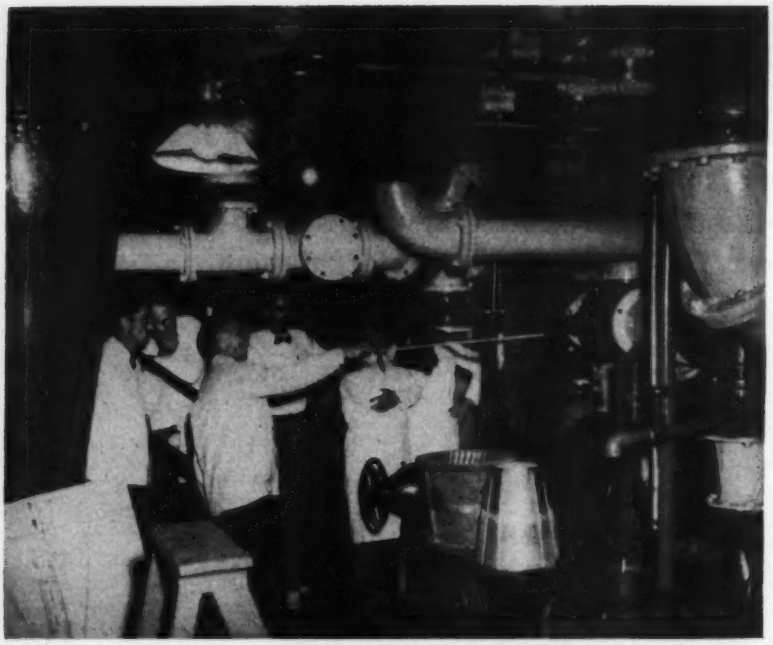


DUO-CYCLING AND REFINING system is explained by a Dilts Machine Works research engineer during the recent tour of Dilts laboratory facilities by Black-Clawson Co. sales personnel.

Allied Industry Notes

Reichhold Chemicals (Canada)
has announced construction of a $500,000 plant at St. Therese, Que. The plant will be known as the firm's eastern division and will manufacture synthetic resins for the paper industry and other products. It is the third major Reichhold project in Canada in the past two years.

Sterling Electric Motors, Inc.,
Los Angeles, has let contracts for the construction of a $1,000,000 plant at Van Wert, Ohio. The new factory is designed for defense production in precision gearing systems for the aircraft industry.

Dye & Chemical Co. of Canada,
Kingston, Ont., has started construction of a $40,000 addition to its plant and laboratories.

Columbia-Southern Chemical
Corp. has been announced as the new corporate name of the now combined Southern Alkali Corp. and Columbia Chemical Division of Pittsburgh Plate Glass Co. The new firm, a wholly owned subsidiary of Pittsburgh Plate Glass, produces soda ash, chlorine, caustic soda, and related chemicals. No personnel changes have been announced.

Minneapolis-Honeywell Co.,
Brown Instruments Div., has named new industrial managers for the Denver, Tulsa, and Kansas City branch offices. W. J. Blackburn is to be in charge of the Denver branch; Donald D. Baker, Kansas City, and Jack F. Smith, Tulsa. The Tulsa office will coordinate the firm's sales activity in the Tulsa, Oklahoma City, and Amarillo areas, which are under the direction of Reginald Walker.

Canadian Allis-Chalmers, Ltd.,
Lachine, Que., has announced purchase of the St. Thomas (Ont.) works of Allis-Chalmers Rumely Ltd. The St. Thomas plant manufactures general machinery.

Consultant Services
in the sales management field have been established in a new Chicago office under the direction of Robert E. Wright. The Wright firm advises manufacturers in the marketing of their products. Mr. Wright has been associated with the consulting field for 25 years.

Black-Clawson Co.,
Hamilton, Ohio, together with its Shartle Bros. Machine Co. Division, Middletown, has announced that Fiskeby Fabriks, A. B., Norrkoping, Sweden, recently commissioned the firm to design and supply all major items of papermaking machinery which are to be used in a new Swedish paperboard mill. Delivery is expected late in 1952.

Flexitallic Gasket Co.,
Camden, N.J., has announced the addition of six new agents and one new distributor to its field organization. Fleck Bros. Ltd., Vancouver, B.C., is the new distributor and will serve Canada's western provinces. The new agents include: Jno. D. Hiles Co., Inc., Pittsburgh; Engineering Products Co., Charleston, W. Va.; Chapman Engineering Sales Co., Cincinnati; De Haven Engineering Co., Indianapolis; Steel & Engineering Products Co., El Paso, Tex., and Energy Control Corp., Philadelphia.

Dow Chemical Co.,
Midland, Mich., has announced that it may build new plant facilities at the rate of $100,000,000 a year for the next several years. Much of the projected program depends on the firm's ability to obtain certificates of necessity. The expansion program will reach all existing plants as well as new ones at Allyn's Point, Conn., and Madison, Ill.

International Printing Ink Co.,
New York, N. Y., has announced that three new IPI contests for the 1951-52 school year are being conducted by the International Graphic Arts Education Association, Washington, D. C. A total of $1,690 in cash prizes are to be awarded in this expanded version of the original IPI competition. Prizes are to be awarded in two divisions for the best essays on the subject, "Color Printing in a Free World." In the third contest students compete in designing the Certificate of Honor that IPI awards each year to all sponsoring teachers.

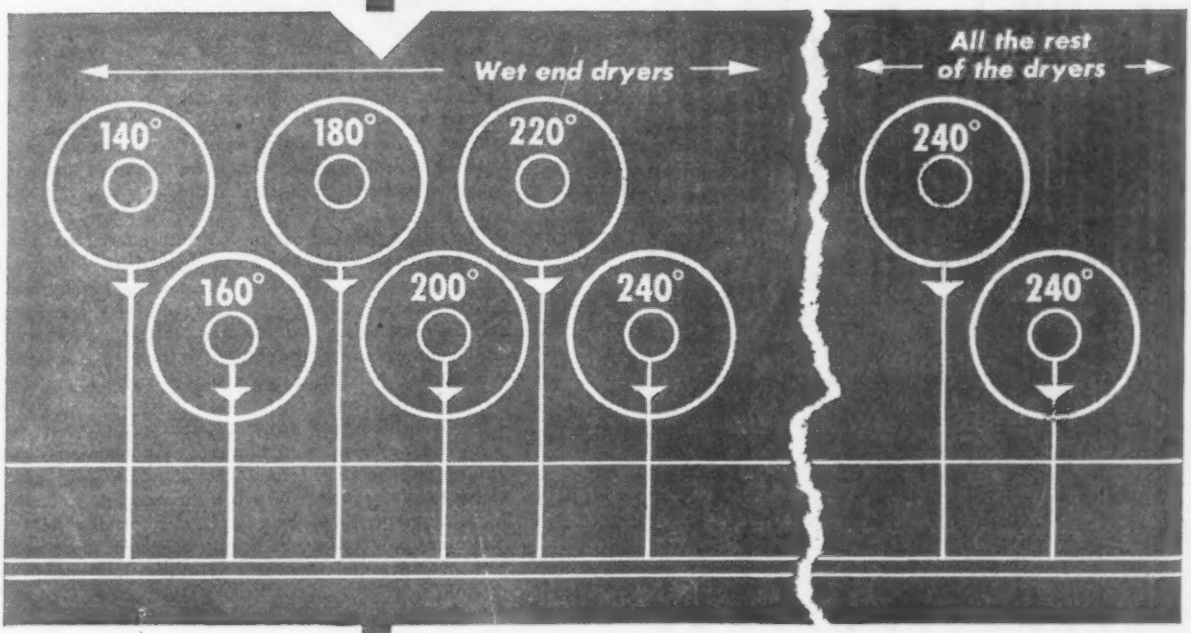
Brown, Boveri (Canada) Ltd.,
subsidiary of the internationally known Swiss firm, is constructing its first Canadian plant at St. John's, Que. Manufacturing is scheduled to begin late this year. About 200 persons will be employed, together with 35 technicians who will be brought over from Switzerland.

Hendrick Mfg. Co.,
Carbondale, Pa., is currently celebrating its 75th anniversary as a manufacturer of perforated metals. The firm was founded by Eli E. Hendrick to make filter presses in conjunction with the oil refinery that he operated in the Pennsylvania town. The plant today comprises 17 buildings covering 6½ acres.

Babcock & Wilcox Tube Co.,
Beaver Falls, Pa., has moved its Beaver Falls district sales offices, formerly located at the plant, to the business area of the city. The office is at 712 11th St. and occupies an entire building.

Swartwout Co.,
Cleveland, has announced the establishment of a sales and service office at Houston, Tex. Both the steam specialties and the roof ventilator divisions will be represented. The entire state of Texas will be served by the office.

HOW THE ARMSTRONG INDIVIDUAL DRYER TEMPERATURE CONTROL GIVES YOU BETTER DRYING:



- **Keeps Wet End Dryers "Cool"**
- **Prevents Sheet from Sticking and Curling**
- **Controls each Dryer Independently**
- **Maintains any Temperature from 100° to 250°F**
- **Positive—Dependable—Guaranteed**

ARMSTRONG Individual Dryer Temperature Controls are used to accurately maintain reduced temperatures in the wet end dryers of a paper machine. This keeps the paper from sticking to the surface of the dryer and also prevents cockle. Each dryer is controlled independently of any other dryer and can be regulated at any point from 100° to 250°F. Temperatures below 212°F are secured by controlling a mixture of steam and air in the dryer. Above 212°F, no air is mixed with the steam and control is entirely by steam pressure.

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WRITE FOR BULLETIN NO. 187 — two-color diagrams and explanation show you how the Control operates to give you accurate dryer temperature control.

ARMSTRONG

Moisture Control Systems
Individual Dryer Temperature Controls
Paper Machine Drainage Traps
Inverted Bucket Steam Traps
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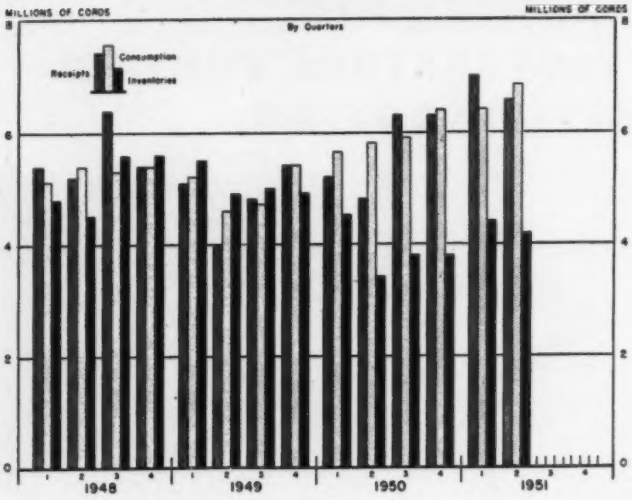
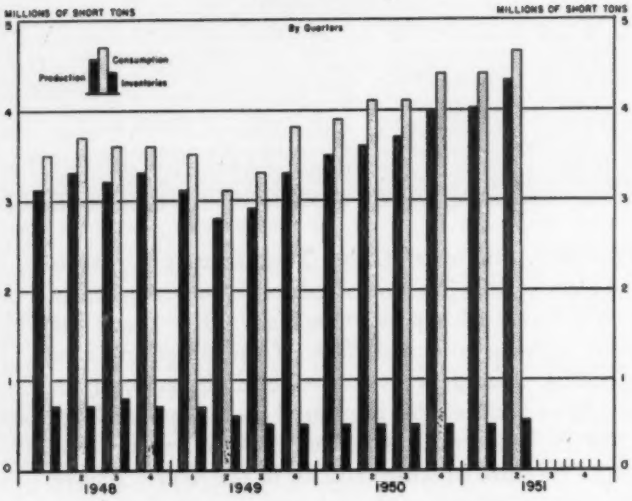
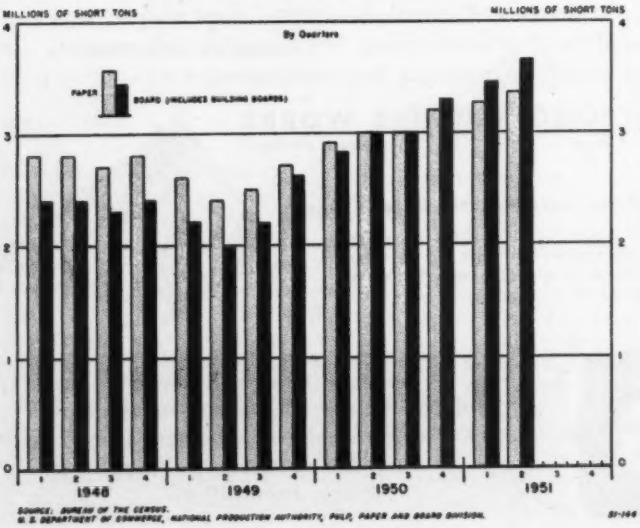
Pulpwood



Wood Pulp



Paper and Board Production



SOURCE: BUREAU OF THE CENSUS,
U. S. DEPARTMENT OF COMMERCE, NATIONAL PRODUCTION AUTHORITY, PULP, PAPER AND BOARD DIVISION.

January-June Paper and Board Production

MARKET UNCERTAINTIES in June and July—due primarily to possible effects of a settlement in the Korean War—have indicated that paper and board production during the third quarter will fall slightly below that of the first two quarters. Other factors influencing the predicted drop in output are lowered retail store sales and an indefinite situation with respect to price levels.

However, the first six months saw all production records broken, with the total for paper and board (including fiber and building boards) reported by the Department of Commerce to be 13,746,000 tons, an increase of nearly 18 per cent over the corresponding figure in 1950. If the rate were to be continued through December, annual production would be about 27,500,000 tons.

The fall in demand during the third quarter has not been equally pronounced in all branches of the industry. The slackening in orders for container and folding box board was sharper than for most grades of paper. But, it is the consensus of the industry that the market will display an uptrend by the end of the third quarter, with a very close balance between supply and demand by the end of the year.

In the field of raw materials, the industry sees no pulpwood problems of significance. Total national inventories at the end of June were about 790,000 cords higher than a year ago. Woods labor seems in generally adequate supply throughout the country. And while the chlorine supply appears to be approximately in balance with overall needs, there is a generally tight situation prevailing.

Still plaguing the industry is the severe shortage of sulphur. The government has warned consumers that new sulphur discoveries will be effective only in one to three years. It is predicted that the shortage will continue for from four to eight months, after which a general improvement may be expected.

Pulpwood

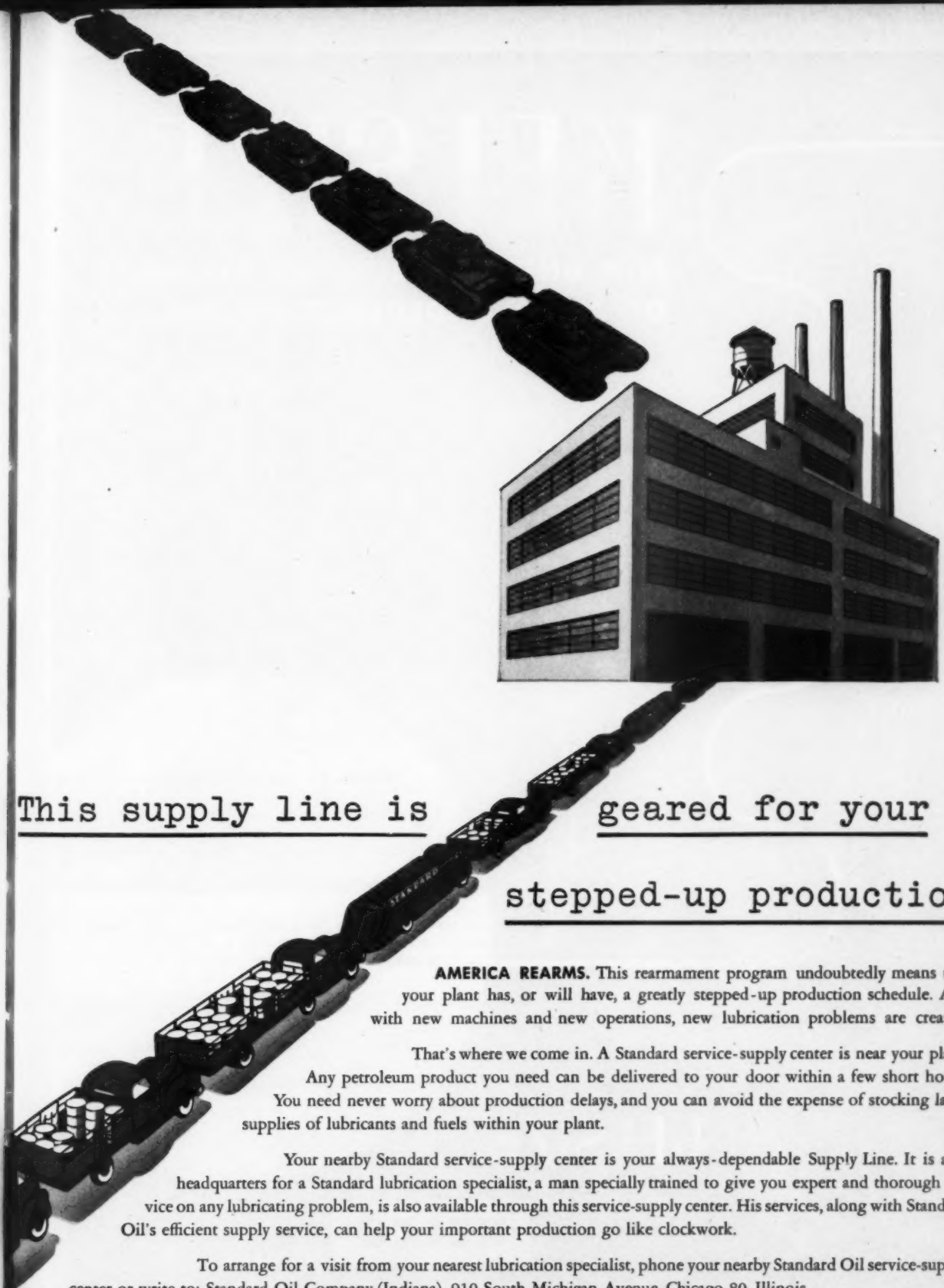
Pulpwood receipts for the first six months of 1951 were 13,572,000 cords, compared with 9,896,000 for the same period last year. Consumption was 13,224,000 cords, compared with 11,408,000 last year. Inventories for June 1951 were 4,181,000 cords, compared to 3,392,000 cords for the same month last year.

Woodpulp

Woodpulp production for the first six months was 8,352,000 tons. During the first half of 1950 the production figure was 7,109,000 tons. Consumption (in paper and pulp mills only) for the first six months of this year was 9,038,000 tons, as compared to 7,969,000 last year, while inventories in June 1951 were 551,000, compared to 513,000 last year.

Paper and Board

Production of all types in the first six months was 13,746,000 tons, as compared to 11,684,000 last year. Paper totaled 5,837,000 tons, compared to 5,251,000 in 1950. Paperboard totaled 6,355,000 tons, compared to 5,159,000 last year. Some representative figures in paper production for the first half of this year, with last year's corresponding figures in parentheses, are as follows: newsprint, 549,000 tons (490,000); groundwood (uncoated and machine coated), 952,000 (817,000); uncoated book, 834,000 (791,000); fine, 677,000 (596,000); coarse, 1,796,000 (1,700,000); special industrial, 212,000 (163,000); sanitary, 617,000 (537,000); tissue, 153,000 (113,000), and absorbent, 71,000 (47,000).



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AMERICA REARMS. This rearmament program undoubtedly means that your plant has, or will have, a greatly stepped-up production schedule. And with new machines and new operations, new lubrication problems are created.

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To arrange for a visit from your nearest lubrication specialist, phone your nearby Standard Oil service-supply center or write to: Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

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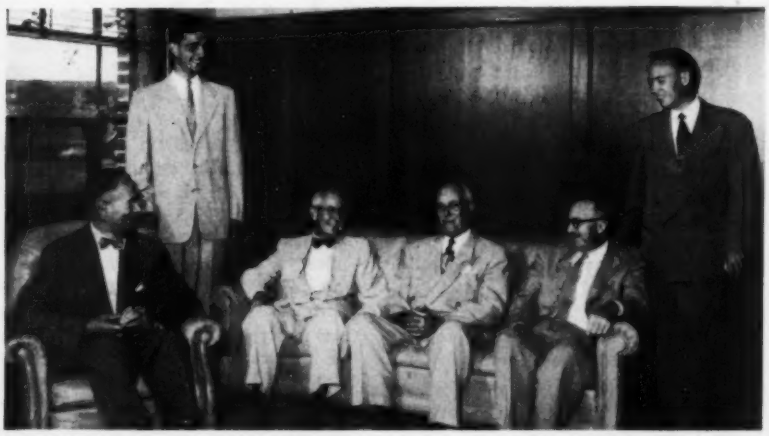
The Paper Industry Pictured Highlights

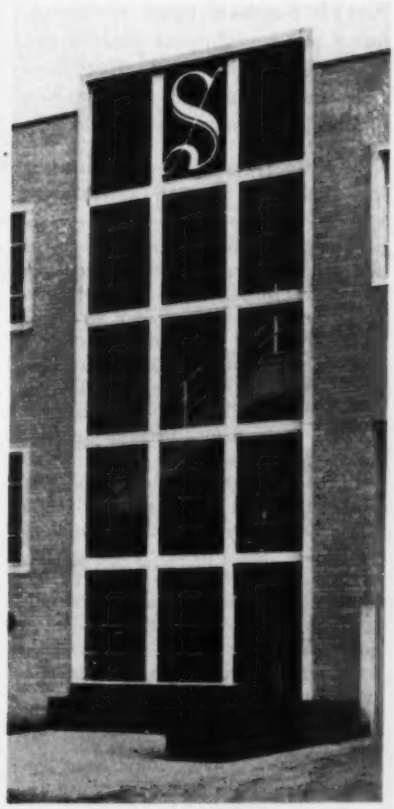
ON-THE-JOB INSTRUCTIONS are given quality control girls at the Middletown, Ohio, carton plant of Gardner Board & Carton Co. Their instructor here is Brainard E. Sooy, chief of quality control.

IN THE DRIVER'S SEAT during groundbreaking ceremonies Pres. R. P. Bemis and Vice Pres. W. E. Jason lend a hand as construction is started on the new Bemis-Jason Corp. plant at Redwood City, Cal.

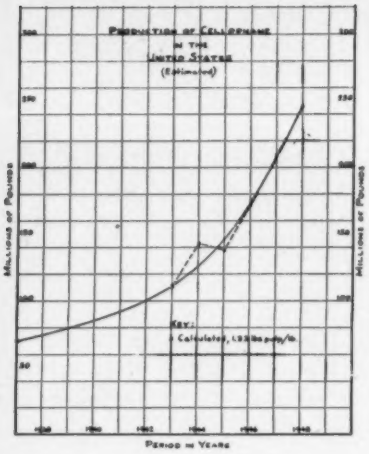


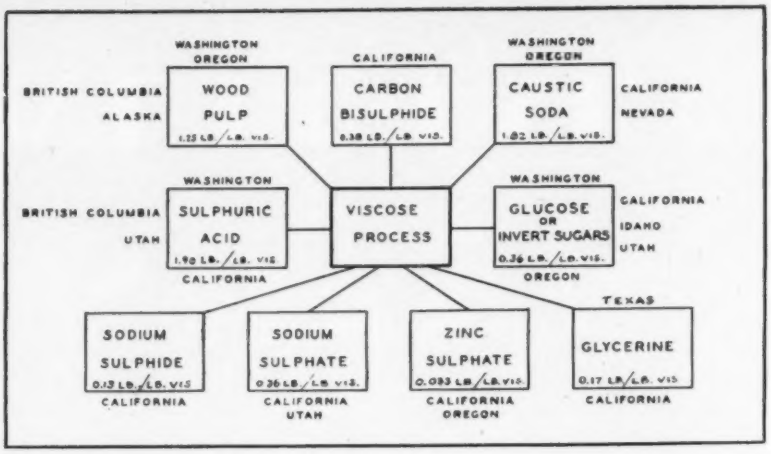
NEW GENERATION gets acquainted with executives of H. W. Butterworth & Sons, Bethayres, Pa. Shown are (L. to R.) J. E. Butterworth, vice president and secretary; J. E. Butterworth Jr.; H. W. Butterworth Jr., president; DeHaven Butterworth, vice president; J. H. S. Spencer, executive vice president, and DeHaven Butterworth, Jr.

SMOOTH BOX CAR INTERIORS result from application of "emergency upgrading liner," kraft paper cemented together with asphaltum, reinforced with rayon yarn.



MODERN ARCHITECTURE is utilized in the entrance of Stanford Paper Company's new warehouse and office building in Washington, D.C.





Rapid growth, plus ... available raw materials ... provide opportunity for establishing a ...

Cellophane Industry in the West

Part I in a series of three articles outlining how a cellophane industry can be developed in the West. Plant locations and markets will be described in the two remaining installments.

WILLIAM C. McINDOE
Consulting Industrial Chemist

CELLOPHANE, because of its eye-appealing quality of transparency, got its start in the wrapping of expensive boxes of candy. From this use it has spread to the protective and transparent wrapping of textiles, paper products, tobacco products, chewing gum, meat products and bakery products, coffee, tea, frozen fruits and vegetables, dry and fresh fruits, vegetables, nuts, soaps, perfumes, drugs, rubber goods, toys and novelty items.

In the forms of braid, ribbon, strings, tubes, straws, etc., it has found textile and haberdashery uses (such as in women's hats and shoes, curtains and drapes). The electrical industry soon discovered its high dialectric strength, superior space factor, heat resistance and resistance to oil and solvents and is using slit cellophane as an insulating material for wrapping magnet wire.

Packaging revolution

Several trade revolutions have contributed materially to the continued and pyramiding success of cellophane: the change-over from bulk to individual packaging; the evolution of the chain-stores, super-markets and self-service. Indeed, cellophane may well have been the spark to set off the packaging revolution by producing quicker turn-over of consumer goods because cutomers bought more readily goods they could see and which they believed were protected from soiling due to handling, dust, germs and moisture.

In addition, food merchants found that the moisture barrier properties of cellophane reduced stock "shrinkage" and spoilage from about 7 per cent to 1 per cent (handling and evaporation losses). Also the pre-packaging practice brought in by wrapping in cellophane and quick freezing of individual cuts of meats, sea foods, and fowl permit the retailer to avoid buying whole carcasses to obtain the premium cuts.

Status of the cellophane industry

In 1923, E. I. du Pont de Nemours & Co. acquired from France the rights to manufacture cellophane in the United States and began commercial production in 1924. Now some six grades are on the market: T-transparent, S-heat scaling, A-anchored, M-moisture-proof, P-plain uncoated, J-fireproof.

Since only three companies are manufacturing cellophane in the United States (du Pont at Buffalo, N.Y., Richmond, Va., and Clinton, Iowa; Sylvania Division, American Viscose Corp. at Fredericksburg, Va., and Olin Industries, Inc., who now has its new plant at Pisgah Forest, N.C., operating) accurate production statistics are not published. However, *Chemical & Metallurgical Engineering* made estimates based on consumption of glycerine which indicated that 1937 viscose sheeting production was about 70,000,000 lbs.(4).

Even with substantial increases civilian usage was marking time first under wartime curtailment and allocations, then under serious shortage of supplies due to lack of new capacity. Early in 1949 the American Viscose Corp. announced expansion in progress at its Fredericksburg, Va., plant which would give 40 per cent of total production instead of the existing 25 per cent. Using the total existing capacity of 220 million pounds estimated in the announcement as a basis, this expansion would add about 55 million pounds to the capacity by 1950 for a new total capacity then of 275 million pounds. Also, it is generally known that du Pont sent a survey team out to the Pacific Coast in 1946-1947 to determine whether the Western markets would support a Western plant and to investigate plant sites with the result that a tentative site was picked near Springfield, Oregon, on the Mackenzie River, according to a du Pont official (5).

However, shortly after the running-out of the moisture-proof patents in 1946 the Anti-Trust Division of the Federal Department of Justice brought suit against du Pont for restraint of trade tactics in the manufacture and marketing of cellophane. This action forced du Pont to shelve plans for any additional plants of their own and influenced their

decision to license and set up competitors in the business (2) (6).

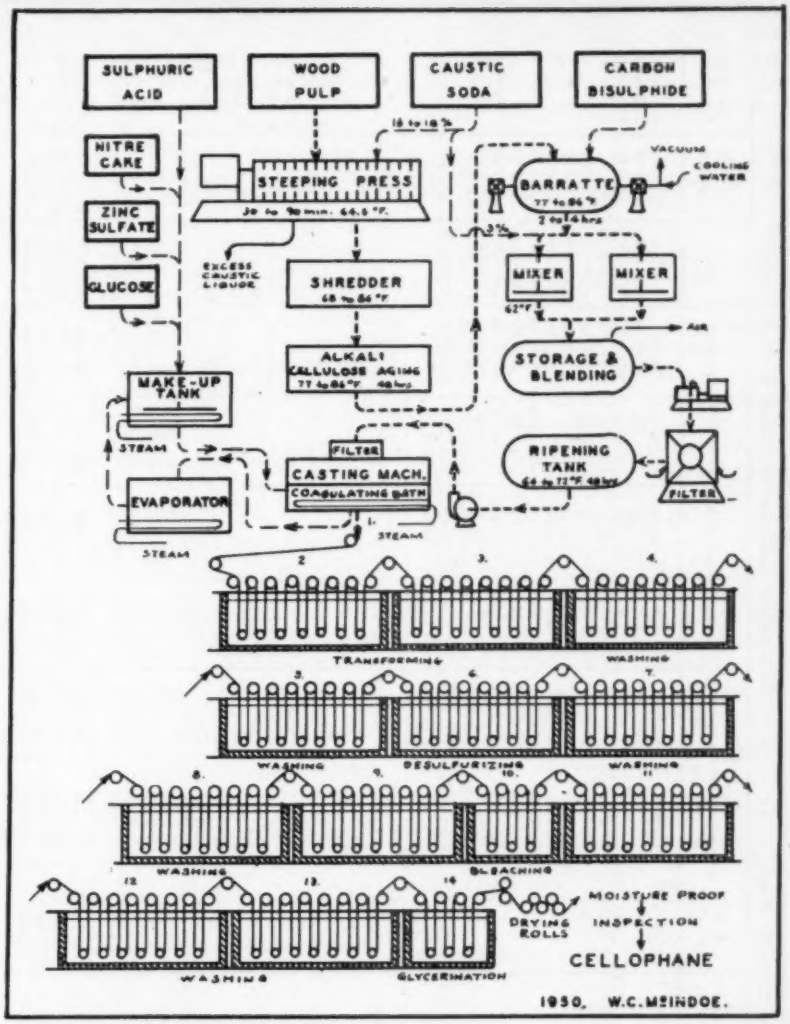
This search for a competitor culminated in the licensing of Olin Industries, Inc. (owners of Western Cartridge Corp. and Winchester Arms) who chose their subsidiary Ecusta Paper Corp. at Pisgah Forest, N.C., to operate the plant to be built by du Pont. For an estimated $20 million investment by Olin, du Pont is giving a license under all patents, helps in design and machinery and will train the operating staff. The plant is to have 9 machines and a capacity of 33-35 million pounds per year.

The expansion by Sylvania (calculated at 55 million pounds) may come on stream in late 1951 and the 35-million pound Olin plant in 1952 to reduce the postwar shortage in cellophane; however, that still means a delay of five to six years in getting additional capacity.

We do not believe that even these increases will come even close to satisfying the shortage; because "the butcher, the baker and the candle-stick maker" are all using cellophane for wrapping and are all struggling under allocations of extremely short supplies. Some old customers can get far less than 50 per cent of their needs; new customers have difficulty getting any cellophane and caught no firm contracts. What they do get is subject to curtailment without warning. A candy manufacturer for lack of cellophane was forced to abandon his wholesale business. One converter said he was turning down orders; another was forced to discontinue an inner printed sheet with consequent loss of several accounts of about 250,000 bags per month.

Manufacturing processes

The process for the manufacture of cellophane is almost identical with that for viscose rayon up to the point of spinning or extrusion (7-11) and a method is shown graphically in the Flow Diagram chart. The viscose solution (ripened cellulose xanthate) formed from wood pulp (dissolving grade) as shown in this flow diagram is extruded under pressure through a submerged, adjustable narrow slot in an acid coagulating bath where pure cellulose is regenerated in film form, caught on rollers and carried through succeeding tanks of warm water to move acid and bath salts, then through desulfurizing tank filled with a basic solution of sodium sulphide and rewashed. The film, still carried on rollers, has at this point a characteristic yellow color which is bleached out by passing it through a sodium hypochlorite bleach tank; following which the film is rewashed thoroughly in a series of tanks and finally passed through a very pure glycerine solution in order to gain softness and pliability. Being very hygroscopic, the glycerine is absorbed and held



Cellophane manufacture by viscose process

Raw Materials	Unit Quantities Required per lb. cellophane (Plasticized only)*	Annual Gross Requirements 35 million lb. capacity plant*
Viscose Process:	(Lbs.)	(Tons/Yr.)
1. Wood pulp, dissolving grade (normally bleached sulfite)	1.04	18,200
2. Caustic Soda (76%)	1.33	23,775
3. Carbon Bisulfide	0.32	5,600
Coagulating Bath:		
4. Sulfuric Acid, 60°Be'	1.58	27,650
5. Sodium Sulfate	0.285**	4,988
6. Zinc Sulfate	0.024**	420
7. Glucose	0.236**	4,130
8. Sodium Sulfide	0.17	2,975
Plasticizing:		
9. Glycerine	0.17	2,975
Operating:		
10. Steam***	70	6,712,330#/day
11. Refrig.	.017 Ton	595,000 Tons
12. Power***	2.7 Kwh	10,800 Kw yrs.
13. Water***	90 - 200 gal.	8,631,000 - 19,178,000 gal./day
14. Direct Labor	0.14 man hrs***	4,900,000 man hrs.
At 40 hr./wk. 50 wk.-yr. equivalent to: No. of men		2,450

Table I—Unit Quantities and Annual Requirements of Raw Materials and Labor for Cellophane Manufacture

Table 2—Sources, Average 1950 Unit Prices and Transportation Costs of Raw Materials and Chemicals for Cellophane Manufacture

Raw Materials and Chemicals	Western Sources	Commercial Package	Unit Price per Pound		Rail Freight Rates per 100 Pounds to Plant (cents)[d]								
			(a),(b) New York	(c) Pacific	Puget Sound		Longview Kelso	Vancouver	Portland	Eugene	Spokane	Klamath Falls	Henderson, Nevada
					Bellingham	Tacoma							
1. Wood pulp, dissolving (bleached sulphite)	Port Angeles, Wash. Shelton, Wash. Hoquiam, Wash.	Bales	$0.0865[c][3]	$0.0835[3]	37-80M	33-40M 17-80M 17-80M	35-80M 31-70M 31-70M	35-80M 22-70M 22-70M	35-80M 24-70M 24-70M	68-80M 57-70M 57-70M	65-80M 65-80M 65-80M	51-80M 46-80M 46-80M	127½-80M 122½-80M 122½-80M
2. Caustic Soda	Tacoma, Wash. Portland, Ore. Pittsburg, Calif. Los Angeles, Calif. Henderson, Nev.	Tank car Drums Tank car Drums Tank car Drums Tank car Drums Tank car Drums	$0.0285[2]	$0.0265[2][7] 0.0275[2]	16-R35 39-30M 36-R35 64-40M 82-100M 116-50M 106-100M 119-40M 134-100M 150-100M	20-R35 25-40M 20-R35 66-R35 77-50M 90-100M 95-50M 118-R35 126-60M	18-R35 25-40M 20-R35 25-40M 66-100M 77-50M 90-100M 85-50M 118-100M 126-60M	20-R35 25-40M 17-R35 22-40M 66-100M 67-50M 90-100M 85-50M 118-100M 116-60M	20-R35 25-40M 66-100M 67-50M 90-100M 85-50M 118-100M 116-60M	38-100M 59-30M 38-100M 59-30M 66-100M 67-50M 90-100M 85-50M 118-100M 116-60M	56-100M 55-40M 56-100M 55-40M 122-100M 96-40M 146-100M 119-40M 174-100M 150-100M	66- 77-50M 59-R35 59-40M 66-R35 67-50M 90-100M 85-50M 118-R35 116-50M	56-Actual Wt. 89½-40M
3. Carbon Bisulphide	Pittsburg, Calif. Stege, Calif.	Tank car	$0.044[1]	$0.05¼-0.05½[8]	121-R35	105-R35 105-R35	105-R35	97-R35	97-R35	97-R35	127-R35	97-R35 97-R35	245-R35
4. Sulphuric Acid, 60° Bé.	Tacoma, Wash. Dupont, Wash. Richmond, Calif. Stege, Calif. Port Chicago, Calif. Selby, Calif. El Segundo, Calif. Los Angeles, Calif. Vernon, Calif. Torrance, Calif.(L.A.) Dominguez Jct., Calif.(L.A.) Garfield, Utah	Tank car	$0.0072-0.00725	$0.01 (9)	22-150M 27- 107- 107- 107- 107- 174- 174- 174- 174- 174- 107-	5-150M 85- 85- 85- 85- 130- 130- 130- 130- 130- 85-	22-150M 22- 85- 85- 85- 85- 132- 132- 132- 132- 132- 85-	22-150M 22- 70- 70- 70- 70- 93- 93- 93- 93- 93- 78-	22-150M 22- 70- 70- 70- 70- 93- 93- 93- 93- 93- 78-	44-150M 44- 70- 70- 111- 111- 111- 111- 163- 159- 159- 163- 163- 78-	70-150M 70- 111- 70- 70- 70- 70- 70- 93- 93- 93- 93- 93- 78-	85-150M 85-150M 70- 70- 70- 70- 70- 70- 93- 93- 93- 93- 93- 78-	44-150M 44- 44- 44- 44-
5. Sodium Sulphate	Portland, Ore. Trona, Calif. Torrance, Calif. Dominguez Jct., Calif.	Bulk-closed cars	Salt cake: $0.016 Desic.: $0.02	$0.0075[6] $0.0195	52-40M 66-100M 66-100M 66-100M	39-40M 51-100M 51-100M 51-100M	24-40M 51-100M 51-100M 51-100M	12-40M 51-100M 51-100M 51-100M	51-100M 51-100M 51-100M	33-40M 51-100M 51-100M 51-100M	62-40M 108-40M 108-40M	64-40M 49-100M 49-100M 49-100M	64-30M-Mix c.l. 65-100M 65-100M
6. Zinc Sulphate	Oakland, Calif.	Bbls.	$0.0615[5]-0.0825	$0.0635[11]	157-40M	101-40M	101-40M	90-40M	90-40M	90-40M	116-40M	89-40M	133½-36M
7. Sodium Sulphide	Modesto, Calif. Los Angeles, Calif.	Drums	$0.04-0.05[4]	$0.05¼-0.05½[8]	122-40M 132-40M	112-40M 123-40M	112-40M 123-40M	103-40M 112-40M	103-40M 112-40M	103-40M 112-40M	125-40M 137-40M	103-40M 112-40M	126½-40M 89½-40M
8. Glucose (Corn Syrup)	Portland, Ore. (WH)[13] Seattle, Wash. (WH) San Francisco, Calif. Los Angeles, Calif.	Bbls. Bbls. Tank car Tank car	$0.0624-0.0657	$0.0676-0.0699[3]	93-36M 43-36M 145-36M 167-36M	13-60M 102- 124-	39-36M 59-36M 102-36M 124-36M	22-36M 59-36M 102-36M 124-36M	59-36M 102-36M 124-36M	52-36M 111-36M 102-36M 124-36M	65-40M 65-40M	62-30M 76-36M 102- 124-	89½-36M
9. Glycerine	Los Angeles, Calif. Houston, Texas	Tank car Drums Tank car Drums	$0.39-0.40[3]	$0.42½[12]	163-30M 147-50M	149-80M 151-30M 147-50M	114-50M 147-50M	114-50M 147-50M	114-50M 147-50M 147-50M	114-50M 147-50M	176-30M 147-50M	122-80M 139-30M 147-50M	124-36M 134½-36M 132-50M
10. Sodium Hypochlorite, 16%	Tacoma, Wash. South Gate, Calif. San Leandro, Calif. San Francisco, Calif.	Tank truck		$0.24-0.34 per gallon f.o.b. destination									
11. Chlorine, Liquid	Tacoma, Wash. Portland, Ore. Pittsburg, Calif. Los Angeles, Calif. Henderson, Nev.	Tank car Cylinders Tank car Cylinder Tank car Cylinder Tank car Cylinder Tank car Cylinders	$0.0305[14]-0.0425	$0.055 (10)	28-60M 39-30M 58-60M 80-30M 152-60M 153-36M 190-60M 178-36M 216-100M 225-40M	29-60M 40-30M 111-60M 108-30M 161-60M 138-36M 198-100M 195-40M	28-60M 39-30M 29-60M 29-30M 108-30M 113-36M 158-60M 138-36M 188-100M 185-40M	28-60M 39-30M 17-30M 22-30M 92-60M 103-36M 141-60M 125-36M 184-100M 171-40M	29-60M 40-30M 94-60M 105-30M 144-60M 128-36M 188-100M 175-40M	86-60M 97-30M 57-30M 57-30M 94-60M 105-30M 144-60M 128-36M 199-60M 175-40M	82-30M 105-30M 82-30M 105-30M 176-30M 119-36M 219-30M 143-36M 274-60M 190-40M		220-60M 223-36M 220-60M 223-36M 135-30M 85-30M

(1) Freight allowed to competitive points; (2) 10¢ premium per 100 lb. included; (3) delivered; (4) freight equalized; (5) freight allowed; (6) f.o.b. Trona, min. c.l. 40 tons; (7) freight collect and equalized with Willbridge, Portland, Ore.; (8) f.o.b. Stege; (9) 66 deg. Bé. acid, f.o.b., Tacoma; (10) f.o.b. works; (11) 22.8 per cent grade only, at present; (12) f.o.b., Houston, Texas; (13) (WH)=warehouse stocks; (14) f.o.b. works, freight equalized; (a) C.&E.N. 9/25/50, f.o.b. wks.; (b) O.P.D.R. 9/25/50, f.o.b. wks.; (c) direct mfrs' quotations; (d) Subject to M lb. minimum weight shipments or to the minimum tank car gallonage provided in Rule 35 of "Consolidated Freight Classification Number 19."

tenaciously in the film to the extent of about 15-17 per cent by weight. The moistureproof cellophane so sought after as a wrapping for food products is made by coating the film on one or both sides with a nitrocellulose lacquer and again drying (1) (3).

Materials balance

The materials, chemicals and services required are similar to those for the viscose rayon process plus glycerine and finishes for heat sealing, moistureproofing and fireproofing. These materials are given in Table 1. All items are calculated upon the basis of the glycerinated product before any additional finishes and per pound and by-tonnage required for an economic size plant. The figures given are gross consumption without corrections for essential recovery practices. It has been stated that the minimum size plant capable of economic operation in a normal market would manufacture about 35 million pounds per year (2).

Western sources of raw materials

All of the raw materials and chemicals required are manufactured commercially in the West. Also, warehouse stocks are maintained in major cities. Geographical Western sources are shown above. It is believed that these can be laid down at logical plant sites in the Far West at prices and freight rates equivalent to those prevailing for present locations of the rayon and cellophane industries along the Atlantic Seaboard and in Midwestern States.

1. Wood pulp, dissolving grade, now manufactured by bleached sulphite processes, is one of the major resources of the Pacific Northwest and is produced by Rayonier, Inc., at Shelton, Hoquiam and Port Angeles, Wash.; British Columbia Pulp and Paper Co. at Woodfibre and Port Alice, B.C.; and by the new Columbia Cellulose Co., Inc. (subsidiary of Celanese Corp. of America) at Prince Rupert, B.C. Weyerhaeuser Timber Co. made dissolving pulp nitration grade at Longview, Washington, during World War II for explosives manufacture. In addition, a mill is planned for early construction by Puget Sound Pulp and Timber Co. with the American Viscose Corp. at Ketchikan, Alaska, to increase the supplies of this grade of pulp. All of these mills make the pulp from Western hemlock, balsam firs, and Sitka spruce. Prices for these pulps are quoted per short ton, air dry basis (10 per cent moisture content), freight equalized anywhere on the Pacific Coast and at respective Atlantic Seaboard and Gulf ports. The 1950 price was quoted at $167.00 per ton on the Pacific Coast and $173.00 per ton elsewhere. Thus the Western price is $6.00 per ton less than the Eastern price.

2. Caustic soda is produced in the Pacific Coast states of Washington, Oregon, California, and Nevada. Hooker Electrochemical Co. and Pennsylvania Salt Co. both produce caustic soda in Tacoma, Wash. The latter also has a plant in Portland, Ore. Dow Chemical Co. produces it at the Pittsburg, Calif., plant of their Great Western Electrochemical Div. Stauffer Chemical Co. is operating the Basic Magnesium plant in Henderson, Nev. (near Las Vegas). The 1950 prices were quoted as follows: $2.55 for the 50 per cent and $2.65 on the 73 per cent concentrations per 100 lb., solid basis, standard grade, f.o.b. Tacoma, Washington, freight collect and equalized with Willbridge, Portland, Ore. In the East there is normally a premium charged for high grade or rayon grade liquid caustic soda of 10c per 100 lb. solid basis.

3. Carbon bisulfide is manufactured by Stauffer Chemical Company at Stege (Richmond), Calif., and by the Great Western Electrochemical Div. of Dow Chemical Co. at Pittsburg, Calif. (in connection with the production of flotation xanthates). The 1950 price in tank car lots was $0.05¼-$0.05½ per 100 lbs., f.o.b. Stege, Calif.

4. Sulphuric acid, 60 deg. Bé: sulphuric acid is manufactured in 17 plants in the eleven Western States by 9 firms. Of these, 15 plants use the contact process and two the chamber process.

Apache Powder Co., Inspiration Consolidated Copper and Phelps Dodge Corp. have plants in Benson, Morenci and Douglas, Ariz. General Chemical Co. has three plants in California (El Segundo, Port Chicago and Richmond) and one in Denver, Colorado. American Smelting & Refining Co. has three plants, (Selby, Calif.; Garfield, Utah, and Tacoma, Wash.). Stauffer Chemical Co. has four plants in California (Stege, Vernon, Torrance, and Dominguez). Anaconda Copper Mining Co. has a plant in Anaconda, Mont.; E. I. du Pont de Nemours & Co., in Du Pont, Wash., and Standard Oil Co. of Indiana, Casper, Wyo. (12).

60 deg. Bé acid is not presently quoted; but 66 deg. Bé acid from which 60 deg. acid can be made by dilution currently sells for $20.00 per ton f.o.b. Tacoma in tank car lots (2000 lb. of 66 deg. Bé acid will produce 2400 lb. of 60 deg. acid approximately).

5. Sodium sulphate is produced by American Potash & Chemical Corp. from the brines of Searles Lake at Trona, Calif., and by Desert Chemical Co. at Dall Lake, Calif. The 1950 prices quoted by the former are: Salt cake (98.00 per cent Na_2SO_4) in bulk $15.00 per ton in minimum carloads of 40 tons each, in 100-lb. paper bags $20.00 per ton f.o.b. Trona; for desiccated sodium sulphate (99.3 per cent Na_2SO_4) in bulk $39.00 per ton, in 100-lb. paper bags $44.00 per ton, in minimum carload lots of 40 tons each, f.o.b. Trona, Calif., freight allowed to destination in the Western U.S.

6. Zinc sulphate is manufactured on the Pacific Coast by the Chemical and Pigment Company, Oakland, Calif., a division of the Glidden Co. The 1950 quotations on their 22.8 per cent material is $127.00 per ton in carload lots, f.o.b. car Oakland, Calif., with minimum carload freight allowed to California points. Maximum freight allowance in California is $6.18 per ton.

7. Sodium sulphide is manufactured by the Barium Products Div. of Westvaco Chemical Div. of Food Machinery and Chemical Corp. at Modesto, California. The present price of flake sodium sulphide in 410-lb. net metal drums is $5.50 per 100 lb., and the solid sulphide is $5.00 per 100 lb. in carload lots f.o.b. Modesto.

8. Glucose, or corn sugar, has been used by the rayon and cellophane industries in three grades: 70-Acme, 80-King, and 43 deg. corn syrup, which have the following analyses.

Analysis of grades of glucose (per cent)

	43 deg. Syrup	70-Acme	80-King
Water content	18	16 (cake)	11
Dextrose (maltose)	42	70	80
Dextrine	40	14	9

All of the Western plants producing glucose have been built since 1939. Following World War II (1947) six companies with twelve plants in Washington, Oregon, California, and Idaho are making or preparing to make glucose from potato starch, wheat starch and artichokes. Corn Products Refining Co. of Chicago maintains warehouse stocks in Western states for the candy and soft drink manufacturers.

The 1950 prices quoted by the latter are: for 70 deg. Pale Acme $6.76 per 100 lb., for 80 deg. King $6.99 per 100 lb., both delivered anywhere in the West; for 3-Star 43 deg. Bé syrup in tank cars, $5.87 per 100 lb.

In addition it may be possible to substitute invert sugar prepared from our abundant Western supplies of cane and beet sugar. Indeed some invert sugar has been marketed on the Pacific Coast as a syrup mixture of glucose and fructose containing 75 per cent solids, with the sucrose 50 per cent inverted.

9. Glycerine was manufactured by Shell Chemical Corp. synthetically at its Dominguez, Calif., plant, but now at Houston, Texas, and by Carnegie Chemical Mfg. Co. in Los Angeles in connection with soap manufacture.

The present Western price for glycer-

Steps; (8) 66 deg. Bé acid, f.o.b. Tacoma; (10) f.o.b. works; (11) 22.8 percent; (12) delivered; (13) freight equalized; (15) freight allowed; (6) f.o.b. Trona, min. c.l. 40 tons; (7) freight collect and equalized with Willbridge, Portland, Ore.; (8)

ine in tank car lots is $0.42½ per lb. f.o.b. Houston, Texas.

10. Sodium hypochlorite is quite generally used as a bleach for cellophane (and for wood pulps, for that matter). It is manufactured by the Lady's Choice Co. in San Francisco, California, and by the Purex Corporation, Ltd., in South Gate, Los Angeles, California. However, only the latter is believed to produce a 16 per cent material. For the 16 per cent product present prices vary from 24c to 34c per gallon f.o.b. destination.

However, it is common practice for pulp mills removed a distance from a manufacturing source of caustic soda-chlorine to make their own hypochlorite from caustic soda (see item 2 above) and liquid chlorine which is priced at about $51.00 per ton in tank car lots.

The above Western prices are compared with Eastern prices quoted in technical journals in Table 2, which includes also a tabulation of freight rates for raw materials to and finished cellophane from suggested logical plant site areas.

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Centrifugal Pumps

How pump heads are determined and used

Part 17 of a series . . . .

IGOR J. KARASSIK and ROY CARTER
Application Engineers
Worthington Pump & Machinery Corp.

HEAD TERMS of a general nature were discussed in the preceding part of this series. This part will cover head terms as used with pumps and, except as otherwise noted, the definitions are based on the current Standards of the Hydraulic Institute.

Material from this article will be included in a book on centrifugal pumps now being prepared by the authors; hence, all rights to republication are reserved by the authors.

As now defined, the total suction head (Symbol h_s) is the static suction head above the pump centerline minus the friction head losses including entrance loss in the suction piping for the capacity being considered, plus any pressure (a vacuum is a negative pressure) existing in the suction supply. Rather than express the suction head as a negative value, the term suction lift is generally used when the suction head is negative and when the pump takes its suction from an open tank under atmospheric pressure.

Since a suction lift is a negative suc-

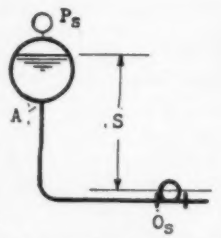


Fig. 1—Suction from source under pressure other than atmospheric and located above pump centerline.
$h_s = S - h_{fs} - h_1 + P_s$

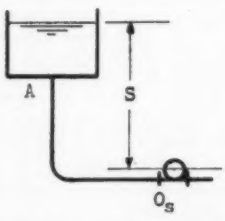


Fig. 2—Suction from source under atmospheric pressure and located above pump centerline.
$h_s = S - h_{fs} - h_1$

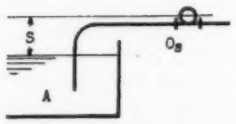


Fig. 3—Suction from source under atmospheric pressure and located below pump centerline.
$h_s = (-S) - h_{fs} - h_1$
$-h_s = S + h_{fs} + h_1$

Nomenclature of heads not shown on diagrams: h_1 = entrance loss at A; h_{fs} = total friction loss from A to O_s; h_{vs} = velocity head at O_s; h_{sg} (gage reading at O_s corrected to pump centerline) = $h_s - h_{vs}$.

Determination of suction head for three typical suction layouts.

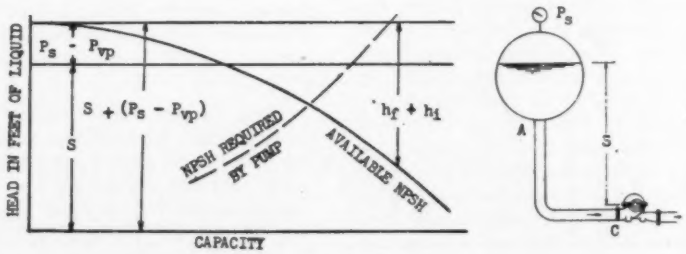


Fig. 4—NPSH = $S + (P_s - P_{vp}) - (h_{fs} + h_1)$,
where: h_{fs} = friction loss in suction line from A to C; h_1 = entrance loss at A; P_{vp} = vapor pressure of liquid at pumping temperature.

All heads and pressures must be expressed in feet of liquid at the pumping temperature with proper algebraic signs. While P_s and P_{vp} can either be in gage or absolute values, they must both be measured above the same datum. Some engineers include h_1 as part of h_{fs}.

Determination of NPSH available at pump centerline.

tion head measured below atmospheric pressure, the total suction lift (Symbol also h_s) is the static suction lift measured to the pump centerline plus the friction head losses as defined above. (In some cases it is advantageous to express both suction and discharge heads in absolute pressure but generally it is suitable to measure them above or below atmospheric pressure.) A gage on the suction of a pump, when corrected to the pump centerline, measures the total suction head above atmospheric pressure minus the velocity head at the point of attachment. As a suction lift is a negative suction head, a vacuum gage will indicate the sum of the total suction *lift* and velocity head at the point of attachment.

The three most common suction supply and pump relations are illustrated. Fig. 1 involves a supply in a tank under a pressure other than atmospheric and includes all the components of suction head. If h_s is to be expressed as a gage reading and P_s is a vacuum, the vacuum expressed in feet of liquid is a negative pressure head and would have a minus (−) sign. If the pressure P_s is expressed in absolute pressure values, h_s will also be in absolute pressure values.

Fig. 2 is a common installation with a suction supply under atmospheric pressure located above the pump centerline. Therefore the suction head (expressed as a gage value) has a P_s value of zero which can be dropped from the formula.

Fig. 3 is the most common installation for pumps handling water and involves a supply located below the pump centerline. In such a case it is optional whether the suction head be expressed as a negative suction head or in positive values as a suction lift. As the source of supply is below the pump centerline which is the datum line, S is a negative value in our calculations for suction head. It is to be noted that the suction lift formula is the same as for suction head except that both sides have been multiplied by −1. A gage attached to the pump suction flange corrected to the pump centerline will register a vacuum or negative pressure. To get the suction head it is therefore necessary to add algebraically the velocity head to this negative pressure or, if it is desired to work in terms of vacuum, the velocity head is subtracted from the vacuum to get the suction lift. For example if the gage attached to the suction of a pump with a 6 in. suction pumping at a capacity of 1000 gpm. of cold water showed a vacuum of 6 in. of mercury (equal to 6.8 ft. of water), the velocity head at the gage attachment would be 2.0 ft. of water and the suction head would be (−6.8+2.0) or −4.8 ft. of water or the suction lift would be (6.8−2.0) or 4.8 ft. of water.

As most centrifugal pump troubles occur on the suction side of the pump, it is important that inquiries for new pumps give the vendors complete information on the suction conditions including any variations that will be encountered in operation. For some complex problems it is often necessary to show the variation in total suction head graphically superimposed on the suction head limitations of the pump being considered in order to see if the pump is suitable.

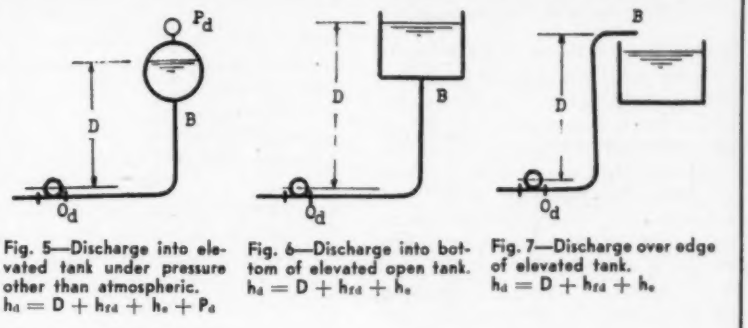


Fig. 5—Discharge into elevated tank under pressure other than atmospheric. $h_d = D + h_{fd} + h_e + P_d$

Fig. 6—Discharge into bottom of elevated open tank. $h_d = D + h_{fd} + h_e$

Fig. 7—Discharge over edge of elevated tank. $h_d = D + h_{fd} + h_e$

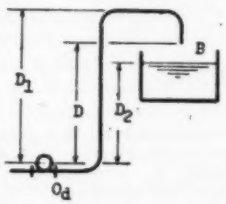


Fig. 8—Discharge through loop into elevated tank (discharge not sealed). $h_d = D + h_{fd} + h_e$

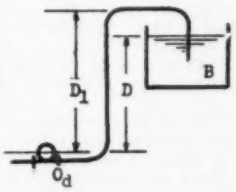


Fig. 9—Discharge through loop into elevated tank (discharge sealed). $h_d = D + h_{fd} + h_e$

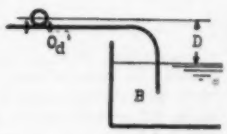


Fig. 10 — Discharge into body of liquid at elevation below centerline of pump. $h_d = (-D) + h_{fd} + h_e$

Nomenclature of heads not shown on diagrams: h_e = exit loss at B; h_{fd} = total friction loss from O_d to B (including any siphon losses); h_{vd} = velocity head at O_d; h_{dg} = gage reading at O_d corrected to pump centerline = $h_d - h_{vd}$.

Determination of discharge head for six typical discharge layouts.

Net positive suction head

In the pumping of liquids, the pressure at any point in the suction line must not be reduced to the vapor pressure of the liquid. The available energy that can be utilized to get the liquid through the suction piping and suction waterway of the pump into the impeller is thus the total suction head less the vapor pressure of the liquid at the pumping temperature. The available head as measured at the suction opening of the pump has been named *net positive suction head* and is generally known by its initials, NPSH.

Both the suction head and the vapor pressure should be expressed in ft. of liquid being handled and must both either be in gage or absolute pressure units. A pump handling 62 F. water (vapor pressure = 0.6 ft.) at sea level with 0 ft. total suction lift, has an NPSH of 33.9−0.6=33.3 ft., while one operating with 15 ft. total suction lift has an NPSH of 33.9−0.6−15=18.3 ft.

A pump operating on a suction lift will handle up to a certain maximum capacity of cold water without cavitation occuring. Under these conditions, the NPSH or amount of energy available at the suction nozzle of the pump is the atmospheric pressure minus the sum of the suction lift and the vapor pressure of the water. To handle this same capacity with any other liquid, the same amount of energy must be available at the suction nozzle. Thus, in case of a liquid at its boiling point, this energy has to exist entirely as a positive head while, if the liquid is below its boiling point, the suction head required is reduced by the difference between the pressure existing in the liquid and the vapor pressure corresponding to the temperature.

It is necessary to differentiate between *available* NPSH and *required* NPSH. The former represents a characteristic of the system in which a centrifugal pump works and is the difference between the existing absolute suction head and the vapor pressure at prevailing temperature. The required NPSH is function of the pump design and represents the minimum required margin between suction head and vapor pressure at a given capacity.

Both the available and required NPSH

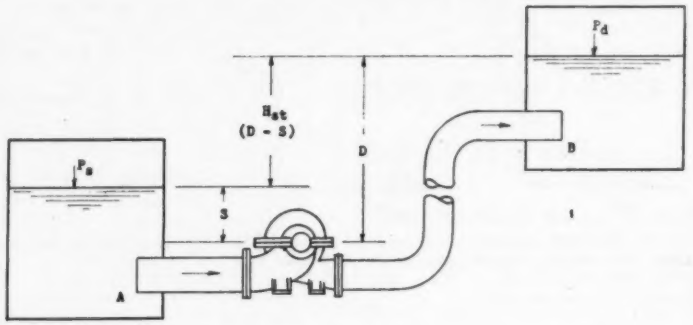


Fig. 11—Suction head: $h_s = S - h_{fs} - h_i + P_s$
Discharge head: $h_d = D + h_{fd} + h_e + P_d$
Total head: $H = h_d - h_s$
$H = H_{st} + h_f + h_i + h_e + (P_d - P_s)$
$NPSH = S - h_{fs} - h_i + P_s - P_{vp}$

Nomenclature of heads not shown on diagram: h_{fs} = friction head loss in suction line; h_{fd} = friction head loss in discharge line; h_f = total friction head loss from A to B; P_{vp} = vapor pressure of liquid at pumping temperature; h_i = entrance loss at A; h_e = exit loss at B. (Some engineers include entrance and exit losses in h_{fs} and h_{fd}.)

All heads and pressures must be expressed in feet of liquid with proper algebraic signs. Pressures P_s, P_d, and P_{vp} can be either in gage or absolute values but, in any case, must all be measured above the same datum. To convert pressures in psi (pounds per sq. in.) to feet of liquid, multiply by 2.31 and divide by specific gravity of the liquid at pumping temperature.

General formulas for suction head, discharge head, total head, and NPSH.

vary with capacity as illustrated in Fig. 4. With a given static pressure or elevation difference at the suction side of a centrifugal pump, the available NPSH is reduced with increasing capacities by the friction losses in the suction piping. On the other hand, the required NPSH, being a function of the velocities in the pump suction passages and at the inlet of the impeller, increases basically as the square of the capacity.

A great many fatcors, such as eye diameter, suction area of the impeller, shape and number of impeller vanes, area between these vanes, shaft and impeller hub diameter, impeller specific speed, the shape of the suction passages, enter into the determination of the required NPSH.

Suction limitations for given capacities in a specific pump were formerly expressed in terms of permissible suction lift at sea level. This required considerable calculation if the pump was to handle water at higher temperatures, if the pump was to handle a liquid other than water, or if the pump was installed at some location above sea level. There is a marked tendency to indicate the capacity vs suction limitation of all centrifugal pumps in a NPSH vs capacity form.

How suction conditions are specified

The importance of advising the manufacturer of the actual suction conditions for a centrifugal pump at the time of its purchase cannot be over-emphasized. A pump will be unable to meet its design capacity conditions unless the suction head can provide enough energy to get the liquid into the pump as discussed above under the subject of NPSH. If a cold non-volatile liquid is to be handled, it is necessary to know whether there is head on the suction or whether the pump will handle a suction lift and if the latter, what will be the maximum lift. In the event that the liquid is hot or under a pressure corresponding to or near to its vapor pressure, the pump must be installed with head on suction and the available submergence must be made known. In case of liquids other than water information on the pumping temperature and vapor pressure is also necessary.

Any expected or probable variations in the suction conditions—from maximum to minimum should also be specified.

Discharge head

Discharge head (Symbol h_d) of a centrifugal pump is the head measured at the discharge nozzle and can be expressed in absolute or gage readings. In any system h_d is the algebraic sum of the static head, the friction head losses for the capacity being considered, the exit loss at the end of the discharge line and the terminal head or pressure expressed in feet of liquid.

Established practice is to express the discharge and suction heads of a horizontal pump with the pump centerline as datum and, usually, the discharge and suction head of a vertical pump is given with the centerline of the discharge as datum. The discharge and suction heads can be given with other elevations as datum but, in such cases, it is necessary to indicate at what datum the heads are measured. This practice is often necessary, because, prior to the purchase of a pump, the exact elevations of the pump centerline or discharge centerline have not been determined.

A gage at the pump discharge, when the reading is corrected to the pump centerline, will indicate the discharge head minus the velocity head at the point of attachment.

Some typical discharge systems are illustrated. Fig. 5 shows a system in which the pump delivers to an elevated tank in which a pressure other than atmospheric exists, and therefore includes all the components of discharge head. Fig. 6 is similar to Fig. 5 except that atmospheric pressure exists on the discharge liquid level. In this case and the following cases, if the discharge head is to be expressed as a gage reading, P_d is zero and is therefore not shown in the formula. Should it be necessary to express the discharge head in absolute values, the atmospheric pressure expressed in feet of liquid is added to the discharge head expressed as a gage reading.

While Fig. 7 illustrates an overhead tank, it applies to all cases of "overboard discharge". The actual useful static head (the distance from the pump centerline to the discharge water level) is less than the actual static discharge head D. It is possible to recover all or part of this by incorporating a siphon leg (see Figs. 8, 9 and 10) on the discharge. While Figs. 8 and 9 would theoretically be the most efficient, it is often desirable for other reasons not to use a sealed discharge, such as to prevent the possibility of a back flow when the pump is stopped.

In Figs. 8, 9 and 10 a siphon leg is involved and the effectiveness of the siphon will depend both upon the length of the siphon leg and the design of the piping. Varying with the design, the recovery could be anything from 0 to 100 per cent. For example, in Fig. 8, if the pipe were very large for the capacity, the pipe would not run full and, as a result, the actual static discharge head would be the distance to the actual water level in the loop of the piping. All cases involving a siphon leg have to be investigated carefully to see what percentage of recovery can be expected and the loss included in h_{fd}.

As the absolute pressure at any point

in a siphon must be in excess of the vapor pressure of the liquid, it is theoretically possible to have a siphon leg approaching 34 ft. with air free cold water at sea level. In most cases, the water being handled is not air free and a reduction in pressure below atmospheric causes separation of this air thus reducing the effectiveness of the siphon. With water, siphons over 20 feet high are rarely encountered. It is questionable if many of those under 20 feet are 100 per cent effective.

It is necessary that the design be such that the air entrapped will be washed out or removed when operation begins so that the siphon is established. It is also to be noted that, unless the air in the loop can be evacuated, the pump will have to operate during the starting period against a maximum static component indicated as D_1. In some condenser circulating installations, this results in a much higher starting head than the normal operating head and special consideration has to be given to the characteristic of the pump. This can also be true in Fig. 5 if P_4 is a negative pressure which is not established until after pumping has commenced as in the case of a barometric condenser.

In systems where there is a variation in some element of the discharge head, it is generally advantageous to establish the discharge head at various capacities and prepare a graph showing the variation with capacity. When combined with the suction head, the resulting chart indicates the system head.

Specifying discharge head

The discharge head, which determines the design conditions for a pump, should be stated with the understanding that is generally composed of static elevation (or pressure) and frictional losses in the discharge piping and that any variations in the static head must be known in order to determine the maximum and the minimum head against which the pump is to operate. Specifying an excessive total head has actually the same effect as specifying excessive capacity. Since a centrifugal pump will always operate at the intersection of its head-capacity curve and of the system-head curve, a pump which develops an excess of head will, unless artificially throttled, deliver an excess in capacity as its curve will intersect the system-head curve at a greater flow.

By breaking up the discharge head into static and friction head, it is easily seen whether the friction losses are excessive. If the piping to be used is too small, the required pump and its driver will be more expensive than necessary and the cost of operation greater than if the proper size pipe were used. As a rule of thumb, the friction losses should not be more than 10 to 20 per cent of the static head for comparatively short pipe lines.

When the total cost involved is high and justifies an extremely detailed analysis, it is possible to determine the most economic size of pipe by plotting the sum of the amortization of initial pump, driver and piping cost plus operating cost versus pipe sizes.

In certain special applications, the pump may be required to develop—for short periods—discharge pressures in excess of the design conditions. A typical example is a condenser water circulating pump which is to be installed in a system utilizing a siphon effect. The head to be developed consists only of the frictional losses through the piping and through the condenser itself and is therefore of fairly low magnitude. However, in order to enable the condenser circulating pump to deliver water through the condenser, it is necessary to prime the system, in other words, to discharge water over the siphon and the design of the pump must be such as to permit it to develop a head at shut-off considerably higher than the normal operating head.

Total head

The total head (Symbol H) of a centrifugal pump is the energy imparted to the liquid by the pump. It is the difference between the discharge head and the suction head. Thus, as a suction lift is a negative suction head, the total head is the sum of the discharge head and the suction lift. If the discharge head and the suction head are not determined independently, the total head can be calculated by determining the algebraic sum of (1) the static head from supply level to discharge level (2) all friction losses for the capacity being considered, (3) the entrance and exit losses, and (4) the terminal pressure minus the suction supply pressure. For complex systems involving both vacuums and pressure, it is often easier to convert all the various vacuums and pressures into absolute pressure values expressed in feet of the liquid being handled.

When measured by gages attached to the pump suction and discharge openings the total head is the discharge head (the sum of the discharge gage reading corrected to the pump centerline and the velocity head at the point of attachment of the discharge gage) minus the suction head (the sum of the suction gage reading corrected to the pump centerline and the velocity head at the point of attachment of the suction gage). As it is easy to get the plus and minus signs of the various elements reversed and as there are numerous precautions to be considered in taking gage readings, it is advantageous in any test to follow the instructions in the Test Code of the Hydraulic Institute.

Fig. 11 illustrates the heads involved in the calculations of suction head, discharge head, total head and NPSH.

Head terms for vertical wet pit pumps

Vertical wet pit pumps may be of the volute type or of the turbine type, the latter covering the propeller type and the vertical turbine pumps, formerly called deepwell pumps. The special problems, both of a hydraulic and mechanical nature, encountered in the vertical turbine pump field has resulted in this type being practically a separate field independent of the regular centrifugal pump field with different practices and terminology.

Both the wet pit pumps of the volute type and those of the propeller type have been handled primarily by engineers in the regular centrifugal pump field. With these two types total head is the discharge head measured at the centerline of the discharge nozzle with velocity head included plus the static distance to the suction water level. Thus, the loss in the suction bell and those of the suction strainer and suction piping, if either is furnished, as well as the losses in the column pipe and elbow in the propeller type pumps are charged to the pump.

In vertical turbine pump practice, the following head terminology is used by the National Association of Vertical Turbine Pump Manufacturers.

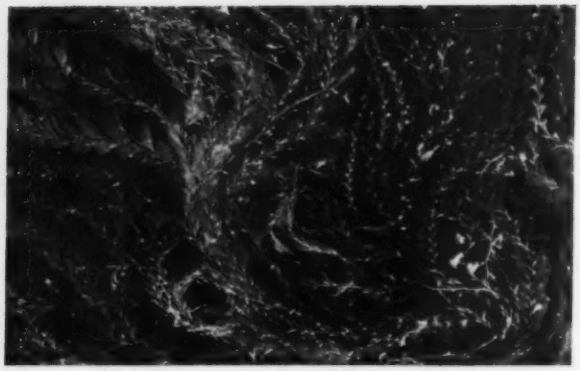
Laboratory head—discharge pressure by gage measured in feet plus static vertical distance to suction water level in a test setup using the minimum length of column and shafting for a laboratory test.

Total head—discharge pressure by gage in feet plus distance to suction water level. (In case of a closed suction, the total head is discharge pressure plus distance to center line of suction gage minus suction pressure, all being in feet.)

Dynamic laboratory head—laboratory head as defined above plus the velocity head at the point of the discharge gage attachment.

Total dynamic head—total head as defined above plus velocity head at the point of the discharge gage attachment and, in case of a closed suction, minus the velocity head at the point of the suction gage attachment.
(What was formerly called Field Pumping Head in the vertical turbine pump terminology is now called "Total Head".)

It is regrettable that there is a difference in terminology between the two fields. In most cases of vertical turbine pumps, the velocity head is a very small portion of the head developed by the pump so its omission actually is of little importance.



Kelp, the giant brown seaweed from which algin is extracted, grows in the coastal waters off Southern California, and is . . .

Gathered by the Kelco Co. harvester boat with an underwater mowing machine and mechanical gathering apparatus

Film forming, penetration controlling, and suspending properties make ALGIN of growing importance to the paper industry for . . .

Sizings, coatings, adhesives

V. V. VALLANDIGHAM, A. L. MAGNUSON and A. MILLER
Technical Dept., Kelco Co.

Part I of two articles describing the major applications of algin in the manufacture of paper

ALGIN, one of the newer chemical materials being widely accepted by the paper and paperboard industry is a product derived from seaweed. Algin is the common generic term designating alginic acid and its water soluble derivatives.

Best known algin product is sodium alginate which is available as a free-flowing granular powder that is completely soluble in hot or cold water. The resultant viscosity of the algin solution depends upon the concentration, the degree of polymerization of the algin molecult and upon the presence of small amounts of heavy metal or alkaline earth ions. Water-holding and penetration controlling properties of algin are great enough so that the concentration of algin found in the final product is only about ¼ per cent or less.

Algins* have many uses in the paper and paperboard industry based mainly on their film-forming, penetration controlling, and suspending properties. These uses are conveniently divided into three broad groups: (1) surface sizings, (2) coatings, and (3) adhesives.

Surface sizing

Application of aqueous solutions of algin to paper or paperboard from the calender stack water boxes or at the size press is based primarily upon the ability of the algin to film on the sheet's surface with a controlled penetration. By this application the printability of the sheet is improved in two ways; (1) as the algin solution stays on the surface of the sheet, it remains in contact with the surface fibers during the calendering operation, softening them and enabling the fuzz to be tightly laid down on the sheet, thus densifying and smoothing the surface, (2) as the algin solution dries upon the sheet's surface a thin film is established. This film is resistant to oil and substances, such as printing inks, waxes, varnishes, etc., and so retards the penetration of these materials.

It is possible to adjust the amount of algin applied by varying the concentratio and type of algin used, making it simple for the papermaker to control the oil, ink, or wax penetration or a Densometer specification by water box operation. This controlled surface absorption developed with an algin sizing can be varied over a wide range from that similar to a straight water-finished sheet to highly resistant surfaces. Rapid accurate tests for measuring oil resistance of a sheet have been developed (1, 2) and have been found to correlate satisfactorily with printing or waxing results.

Effective use of algin sizings is being made in the production of gloss ink board with a surface, sized sufficiently to allow the gloss ink to dry evenly and uniformly upon the sheet's surface. The same fundamental principles are utilized for sizing waxing board and paper, as the algin sizing controls the absorption of the wax into the sheet giving a more efficient wax film. A low concentration algin sizing is applied for flat ink printing applications to give a uniformly absorbing suface for ink receptivity.

Many other specialty surface sizings applied from the calender water boxes or size press using algin combined with other materials are being successfully used. Pigmented sizings using clay, titanium dioxide, or other pigments in the algin sizing make use of the suspending and dispersing properties of the algin for the application of pigment to the sheet's surface for brightening or opacifying.

Algin-sodium silicate sizings are used to improve the grease resistanace and operation of sodium silicate type sizings. Algin-wax emulsion combinations are used to film the wax, thus increasing the water and scuff resistance of the treated sheet. Algin is sometimes used with calender colors to give more uniform coloring and reduce two-sidedness.

Coatings

Properties of algin that make it valuable as a surface sizing agent are useful when applied to water-based coatings. By incorporation of small quantities of algin, usually less than 0.5 per cent, the penetration of the coating into the web can be controlled so that any predetermined absorption can be obtained. The usual procedure is to limit the penetration as much as possible to allow the formation of smooth and uniform coatings. Inasmuch as a coating consists essentially of a pigment suspended in the aqueous medium with a binder present it is obvious that when this coating is applied to a porous surface, the aqueous phase containing the binder will

*The algin usually used in the paper industry is sodium alginate marketed under the trade names KELSIZE, KELGIN, KELGIN LV, and KELGIN XL.

penetrate into the body of the material being coated to a depth dependent upon time of contact before drying, porosity of the surface, type of coating, etc.

This penetration of the aqueous phase results in loss of binder from the pigment remaining (or filtered out) upon the surface. The usual method of compensation for this phenomenon when algin is not used is to increase the binder to pigment ratio until it is found that enough binder remains on the surface with the pigment to satisfactorily form the dried coating. The algin, as an additive, in this type of coating, is dissolved in the aqueous phase and retards or prevents the absorption of this phase into the porous surface. The net result is that the entire coating, and especially the adhesive, is maintained on the surface with the pigment, resulting in a more uniform coating.

In many pigmented coatings, especially when clay is the pigment, the algins increase the "slip" of the coatings, thus allowing the use of higher viscosity but more fluid coatings. The algin modified coatings are useful in both on-machine or off-machine type applications and are being successfully applied by roll, spray, air-knife, and blanket equipment.

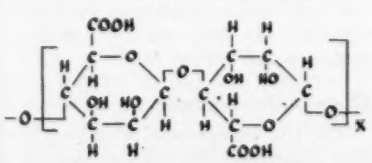
The film forming property of algin is very useful in non-pigmented water-based coatings allowing the successful formation of films upon porous surfaces of such penetrating type materials as casein, soya proteins, starches, dextrins, wax or resin emulsions, etc. Low-cost grease and water resistant coatings on paperboard are being produced utilizing the algin additives.

Adhesives

The penetration controlling property of the algins is applicable in the adhesives field, especially as additives with the starch-dextrin and latex type adhesives. In these applications the important function of the algin is to control the penetration not only of the adhesive but the water also, the water thus reducing curl, blistering, and the other deleterious effects of wet board. Machine speeds are increased because of less water to be removed from the glue line.

Properties of algin

Composition—Algin is classified as a hydrophilic colloid, and chemically it consists of polymerized anhydro-B-D-mannuronic acid whose chain structure resembles that of cellulose. Alginic acid, itself, is only slightly soluble in water but reacts readily with the alkali metal bases and ammonia to form the corresponding water soluble compounds (alginates) which are of greater commercial importance than alginic acid.



Structural formula for algin

Heat applied to an algin solution will cause a gradual decrease in the viscosity of the solution as the temperature increases. This is a reversible effect, and the solution regains its initial viscosity on cooling providing no depolymerization has occurred because of prolonged heating. Algin solutions do not coagulate on heating nor gel on cooling but maintain their smooth flow characteristics over wide temperature variations allowing the user to choose a desirable temperature range for his application without requiring special temperature controls.

Compatibility—Algin solutions are compatible with a large number of compounds which is one reason for the widespread usage and acceptance of algin by industry. These compounds include the carbohydrates, water soluble gums, polyhydric alcohols, various pigments, fillers, resins and dyes and many other materials. In general, the relatively few incompatibilities with algin solutions can be attributed to the presence of alkaline earth or heavy metal salts or excessive concentrations of strong acids or bases. This reactivity with the alkaline earth or heavy metal ions can be usefully controlled in most cases by means of buffer salts, such as sodium polyphosphate, which produce desirable algin gels or solutions.

Other applications

Algin has many varied uses by reason of its film-forming, suspending and stabilizing properties. It is widely used in water vehicle paints, for example, where it improves the brushing, film-forming, and wet edge maintenance characteristics of the paint. The resin emulsion water based paints have found algin useful also to control the rate of absorption on porous surfaces such as wallpaper and plaster. In addition it suspends the pigment and assists in maintaining uniformity in color distribution. These properties of algin make it useful in fire retardant paints or coatings that are water based and usually contain phosphate and borate salts in suspension. Algin also has varied application in boiler feedwater compounds, polishes, cleaners, leather finishes, welding rod coatings and ceramic coatings.

In the rubber industry algin has been used for many years as a creaming agent for rubber latex and as a bodying agent in latex compositions both natural and synthetic. In the textile trade algin is well known for its use in bodying print pastes and in warp size compounds. In the latter case the film-forming properties of the algin solution are again important as the algin acts to hold the size as a smooth continuous film on the surface of the thread which thereby lays down the fibers and reduces the number of breaks during the weaving operation.

How to increase electric truck hoisting speeds

HOISTING SPEEDS of fork trucks are critical where rapid handling of materials is necessary. Any method for saving time by speeding fork-truck operations results in cost savings. Often overlooked is the fact that hoisting speeds of electric trucks can be increased.

Critical considerations are not so much weight and capacity, but rather the rated voltage of the power source. Because the lifting speeds of battery-powered fork trucks are almost directly proportional to the impressed voltage for a given load, higher voltages will provide faster lifting speeds. Hoisting-speed increases of 15 to 20 per cent by this method are not uncommon.

Therefore, when considering the purchase of new equipment or the possibility of increasing the capacity of existing equipment, it is advisable to investigate the economics of a higher-voltage power source.

This does not imply that it is always more economical to operate fork-truck lifts at the highest possible speeds. There are many installations where the capacities of existing equipment are equal to and even greater than the plant's most critical material-handling needs. Naturally, in cases such as these, it would not be wise to install larger batteries.

However, in plants, warehouses and shipping departments where fork trucks are in almost constant use, any gain in time or speed will allow the same number of trucks to do considerably more work. For an example of how a larger power source can increase fork-truck hoisting speeds, let us look at the speeds of a 5000-lb. truck under two voltage conditions.

When powered by a 30-volt industrial battery, this truck has average hoisting speeds of 29 fpm. with empty forks and 14 fpm. when loaded to capacity. However, when powered by a 36-volt power source, the same truck can lift its unloaded forks at a speed of 34 fpm. and capacity loads at 18 fpm. This represents a hoisting-speed gain of approximately 17 per cent. Similar possibilities exist for larger and smaller industrial trucks.

Speeds for telescopic trucks in the second stage of hoisting are slightly less than the first stage because of the greater weight and the additional friction.—*The Mercury Manufacturing Co., Chicago.*

To increase tonnage—plan your production

Case history shows how a specialty paper mill increased its output by fifteen per cent through better methods of programming paper machines

GEORGE G. SALTFORD
Wallace Clark & Co., Inc., New York

PLANNING OF PRODUCTION in a paper mill centers around machines. The operations of preparing pulp, mixing the "furnish", and the finishing operations, are all governed by what grade and how much of it is running over the machines. Since a number of paper mills have as many as four machines, and few of them operate more than twelve, planning the production over this rather small number of centers would appear to be relatively simple.

Operating speeds for the various grades and weights of paper are general knowledge in the mill, so that everyone knows about how long an order will run. Variations in output due to deckle utilization and speed adjustments are not great. Time losses for wash-downs, start-ups, and change-offs are fairly constant. In theory, then, it is much easier to plan production in a paper mill than in most types of plants.

For this reason, many paper companies do not devote enough management effort to the problem of production planning. Even in specialty mills, where there are many short runs of varying grades, the planning department may be merely an "order-releasing" department. A recent case history from our report files shows that good organization and planning methods are a "must" if you want to increase your tonnage, maintain the increase, meet your delivery promises, and keep your sales and mill people on friendly, sociable terms.

One of the top executives of this client company, which was operating a specialty mill, and for which we had done some work in plant maintenance, asked us to take a look at his production planning set-up. Here are the conditions we found: the client's customers were in metropolitan areas, paying high rates for space; their storage facilities were limited so that they had to schedule delivery of paper closely to their short-term requirements. The mill was operating at capacity and had little storage space available.

Who should control programming

Production was controlled by the Sales Manager, who told us: "Our customers can't store goods in advance. We can't either, so we must produce paper when they need it. Since we are operating at capacity and are filling these needs as they arise, we can't do more."

The top executive thought otherwise. He said: "The Sales Manager may be right, but we have to get longer runs on our machines. You say that better planning will do it. Go ahead and show us!"

The head of their Planning Department had spent his life in this work, and although he scheduled the machines on the basis of tonnage, he made mental calculations to adjust for differences in grade and basis weight. In some instances the runs followed the plan very closely. But usually each week's plan was changed several times by verbal orders, with the result that the "plan" was really no plan at all. Futhermore, the entire planning function depended upon this one man who carried most of the information in his head.

New methods necessary

Our first step was to accumulate basic data on production rates in pounds per hour for each grade and weight of paper run on each machine. Individual order quantities were then converted to machine hours. Orders requiring the same furnish were grouped into runs of economic size. Lengths of runs then had to be adjusted to get out the variety of grades required by customers each week. In this manner each week's work was planned in advance and plotted on a Production Chart.

In order to dramatize the planning and to magnify the important time factor, the Production Chart was large—30 x 40 inches—and it was placed on the wall of the mill office in full view of the supervisors. Each run was planned by plotting on the chart the time it should take, including allowances for wash-downs, start-ups, and change-offs. Each run was described briefly—weight and total pounds. Foreseen down time was reserved by X-ing out time ahead. The individual runs on the chart were staggered to allow for last minute changes, without erasures if changes were necessary. This staggering distorted the illustration of time so one continuous red line was used to indicate total load on each machine.

Production orders were filed in pockets for each machine. Those for the planned week were kept by runs in pockets marked "running", "next run", and "waiting", alongside the Production Chart. Another set of pockets was used to segregate future orders by machines and weeks. This permitted analysis of loads for future weeks and transfers of orders to equalize machine loads. Reserving future capacity in this manner prevented over-selling future capacity and then breaking promises to customers.

Uses of production chart

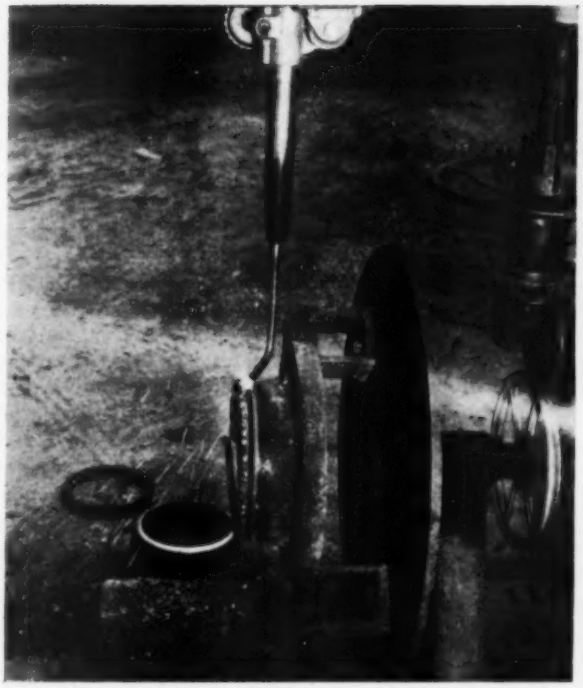
One day in advance of the start of each run, as indicated on the Production Chart, the next run was removed from its pocket and a Beater Order prepared. The Beater Order went to the Beater Engineer. The machine tenders then kept the beater engineer informed of the progress on their runs. This close contact permitted him to prepare new furnish at the proper time to start the next run. While the beater engineer used the Beater Order for his formula, the machine tender checked the arrangement of Production Orders for his deckles. A copy of each Production Order was sent to Finishing and a second copy was filed in the "running" pocket. On completion of the order, this copy was forwarded to Shipping.

Each machine tender kept a log of machine operation showing the size, basis weight, grain, deckle, trim, running time, and production in pounds for each item. He turned this log in at the end of the shift as his report. Twice each day—early morning and late afternoon—data from these logs were used to post progress to the Production Chart.

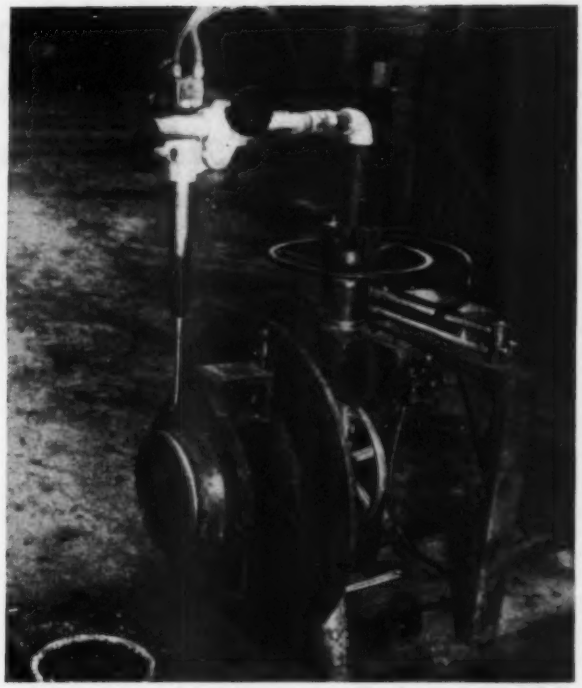
As the new planning methods were put into operation, any variation from planned output was investigated. Some minor differences were due to utilization of deckles. These were to be expected. Other variations revealed the need for corrective action to increase output. Some machine tenders were running particular grades slower than others. This was easily corrected by increasing the slower speeds and the total output was raised accordingly. Wash-downs and clean-ups were reduced in number, with consequent gains in running time. With experience, better data allowed for more accurate forecasting of down time. The maintenance department appreciated this forecasting as they could make better preparation for shutdown inspections and repairs. Minor jobs were done without lost time during scheduled wash-ups and wire changes.

Organization changed

The last change was to move Planning organizationally from Sales to Mill Management. As we have stated, plan-



Rough edges are trimmed clean when used pipe flange is rotated against stationery cutting flame



The feather edge is bevel-cut by a Linde CM-16 cutting machine attached to this special cut-off rig

No machining necessary. . . .

Macon Kraft reclaims used pipe flanges with acetylene cutting rig

Mill changes in the paper and pulp processing are frequent. This means frequent pipe layout changes, calling for cutting down and relocating the pipe. Normally in tearing down or cutting out sections of piping, the flame-cutting process is used with hand-operated blowpipes, thus leaving rough cuts on both pipe and flanges not suitable for welding.

In order to reclaim pipe flanges, the Macon Kraft Co. at Macon, Ga., has devised a unique method of re-using these flanges without machining. An Oxweld CM-16 Cutting Machine (Linde Air Products), has been modified for this purpose. The cutting machine, with its wheels removed, is placed on a special stand, as illustrated. It supplies the motive power for rotating the pipe flange being flame-cut. The cut shown is a bevel, cut to feather edge which prepares the flange for butt welding to a similar piece of pipe. As shown, the cutting blowpipe and nozzle are stationary.

The large faceplate is equipped with two sets of slots for gripping either large or small size flanges. After flange-gripping brackets are positioned on the faceplate for a particular size flange, all flanges of this same size can be cut without re-positioning the brackets. All that needs to be done is to loosen and tighten the set screw on the top bracket. The cutting blowpipe is supported in the proper relative position with respect to the pipe flange being cut by a blowpipe holder mounted to a pipe-type bracket which, in turn, is mounted in the normal blowpipe position of the CM-16 Cutting Machine. All parts that carry the gases to the blowpipe are kept free of oil, grease and dirt.

The practice at Macon Kraft Co. has been to borrow the CM-16 Cutting machine from its plate yard operations. This is done when enough flanges have been assembled to provide a half day of cutting. This occurs approximately every two weeks. It takes only five minutes time to modify the CM-16 machine and install it in the special cut-off rig.

The simplicity and efficiency of this application of an oxy-acetylene cutting machine indicate its general utility in the paper and pulp field.

Continued from previous page

ning had been under the direction of the Sales Department, which quite naturally was interested in serving its customers. The Mill Manager was interested in increasing output. Top management was interested in both.

With the former "hit and miss" system of planning, the amount of production was reduced in direct proportion to the number of changes in runs which the Sales Department threw in for the accommodation of customers. Shortening runs meant more changes and less production. Also, better service to some customers meant breaking promises to others. More customers could be satisfied and greater over-all service given, in terms of total output, if there were fewer changes.

Production planning

The solution to the problem came by operating the new planning methods in a Production Department responsible to Mill Management. This Department now goes as far as it believes safe in increasing the length of runs. Sales keeps a check on customers' orders and notifies top management if the Mill goes too far. Order sequence is then changed if Sales arguments are strong enough.

Output is now over one-seventh, or 15 per cent greater than it was one year ago; increase in sales dollars hits seven figures per annum. More output means more customers; more customers mean more profit; and fewer broken promises mean more satisfied customers. Top management is pleased; Mill Management is enthusiastic; and Sales likes the results and admits better planning did it.

Paper and paperboard making—XVIII

HARRY WILLIAMSON

Beater Operation Studies—Part 3

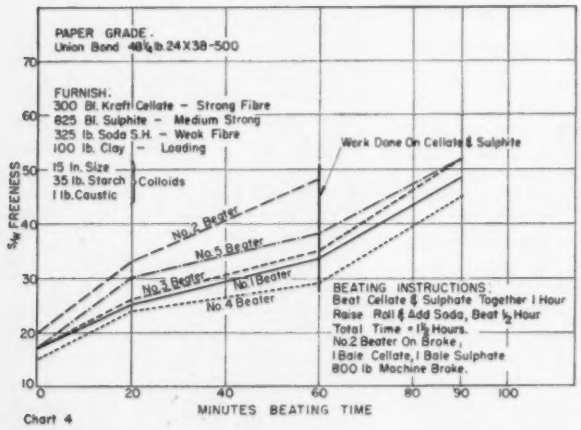
Continuing the study of work done by five beaters on five different furnishes, we have already discussed the first three furnishes. Herein is outlined the study of the fourth and fifth furnishes together with a summary of the various important points brought out by the discussion.

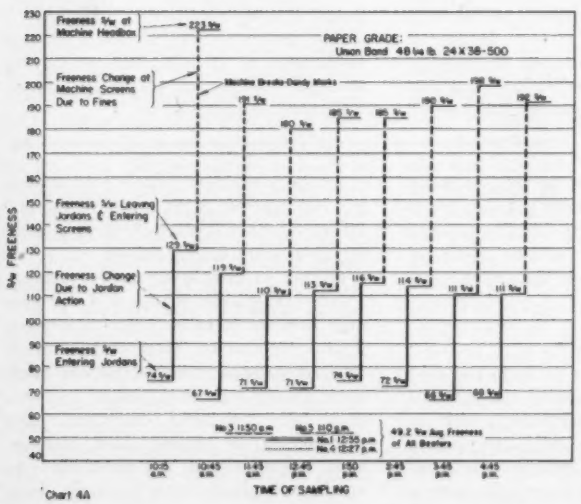
Chart 4

Paper grade:
Bond Papers 48¼ lb. 24 x 38—500
Furnish.

300 lb. Blea. kraft Cellate.....Strong fiber
835 lb. Blea. sulphite.....Medium strong
325 lb. Blea. soda pulp.....Weak fiber
100 lb. Clay.....Loading
Size and starch.....Colloids

Initial Freeness, base furnish, Cellate and sulphite, S/W 18 seconds. Beating instructions as issued by the production manager: "Beat Cellate and sulphite together 1 hour. Raise roll and add soda. Beat ½ hour. Total beating time 1½ hours.


PAPER GRADE.
Union Bond 48¼ lb 24X38-500
FURNISH:
300 Bl. Kraft Cellate - Strong Fibre
825 Bl. Sulphite - Medium Strong
325 lb. Soda S.H. - Weak Fibre
100 lb. Clay - Loading
15 in. Size
35 lb. Starch } Colloids
1 lb. Caustic
Work Done On Cellate & Sulphite
No. 2 Beater
No. 5 Beater
No. 3 Beater
No. 1 Beater
No. 4 Beater
BEATING INSTRUCTIONS:
Beat Cellate & Sulphate Together 1 Hour
Raise Roll & Add Soda, Beat ½ Hour
Total Time = 1½ Hours.
No. 2 Beater On Broke;
1 Bale Cellate, 1 Bale Sulphate
800 lb Machine Broke.
% FREENESS
MINUTES BEATING TIME
Chart 4


PAPER GRADE:
Union Bond 48¼ lb. 24 X 38-500
Freeness % at Machine Headbox
Freeness Change at Machine Screens Due to Fines
Freeness % Leaving Jordans & Entering Screens
Freeness Change Due to Jordan Action
Freeness % Entering Jordans
% FREENESS
TIME OF SAMPLING
Chart 4A

As shown in Table 4 and Chart 4, Number 2 beater must not be compared on the total furnish nor directly on the base furnish with the other beaters. As will be seen on the chart this beater was operating on a light charge of the base furnish and 800 lb. of machine broke which, of course, was composed of the original furnish. The beater roll was raised at the end of 60 minutes.

No. 1 and No. 3 beaters are much closer together in their development RATE TIME on this furnish; only 20 per cent strong fiber and 57 per cent medium strong fiber than they were on the stronger furnishes. The LESS the WORK demanded from the Holland type beater the LESS the inefficiency of a given UNIT will be in evidence. If ALL five of these beaters were operating ONLY on ground-wood or soda pulp they would all appear to be *equally* efficient. That is a MOST IMPORTANT POINT TO REMEMBER. In many mills where a wide range of paper grades are NOT made and it becomes necessary to make a trial run of a new grade with a furnish much HARDER to develop; the ASSUMPTION that all the beaters will WORK at the SAME TIME RATE is the source of much trouble and worry. Please note on the *No. 5 furnish* how really much closer these five beaters are together than they were on the rag and cotton linter furnish. It is to be borne in mind that these five beaters are in a FIRST CLASS MILL and that the mechanical arrangement has been and IS to have these beaters perform the same rate of work. This writer asks the reader to give serious consideration to this point because it is the PURPOSE of a study of this nature to trace down these discrepancies in stock preparation in order that correction can be made and thus close up the bracket of potential error and loss.

No. 5 beater again shows the most rapid initial development in the first 20 minutes of work and operates steadily but at a slower rate until the end of the base furnish beating, that is, the end of the 60 minute period.

No. 4 is again a slow developer all the way through the 90 minutes of beating ending up with 3.333 minutes per degree of freeness as compared with 2.647 minutes per degree for beaters No. 5 and 3.

Table 4—Minutes Per Degree of Freeness, Furnish No. 4

Time Period (Minutes)	Cellate and Sulphite 20	Cellate and Sulphite 60	With Soda 90	Total Degrees Freeness
Beater				
No. 2	1.333	1.967	Roll raised	48.5
No. 5	1.666	3.000	2.647	52.0
No. 3	2.500	3.529	2.647	52.0
No. 1	2.500	3.750	2.903	49.0
No. 4	3.333	5.454	3.333	45.0

Chart 4A

No. 4 Furnish: Cellate and sulphite base furnish. S/W Freeness tests were taken hourly at the following points: (1) Entering the jordan. (2) Leaving the jordan. (3) Mixed volume at the machine head box. Measurement of Work Done by Stock Preparation Units:

Initial freeness, base furnish: S/W 18 seconds
After BEATING total furnish: S/W 49.2 seconds
Work done by beaters: S/W 31.2 seconds
Difference in freeness
by white water dumping: S/W 20.65 seconds
Entering Jordan: S/W 69.85 seconds
Leaving Jordan: S/W 115.5 seconds
Cutting work done by Jordan: S/W 45.65 seconds
GAIN in Freeness by
machine white water "Fines": S/W 78.5 seconds
Average operating freeness on machine wire:
193 S/W

Note the WIDE SPREAD between Freeness values of stock, fully prepared and leaving the jordan, and the SAME stock mixed with the FINES of the machine closed white water system actually delivered to the machine head box. In S/W value the "Fines" represent 78.5 seconds as comparable to 45.65 seconds of freeness value by CUTTING work of the jordan. In addition we find an additional 20.65 seconds of freeness value directly attributable to the dumping white water of the beaters. Freeness test in some form is our only quick method of equating the work done. If we are to assume that we are going to CONTROL our operation of the machine and we KNOW that we EFFECT formation by the drainage of water through a wire mesh whilst leaving the fibers woven into a sheet on the surface of the wire, then we must take cognizance of the effect on FREENESS of the "Fines" in white water both in the beater room and more particularly on the paper machine. The MORE we close up the machine white water system, the more careful will we have to be in taking the fines and their effect into consideration. For economic reasons and again more particularly for regulation of QUALITY reasons, the machine white water system SHOULD BE CLOSED but that is NOT to say that variation in quality will not occur when the system IS closed. (See closed white water system). Whether you agree with this writer's opinion as to the causes of variation found to exist BECAUSE of a closed white water system is entirely a matter of personal choice. The figures and graphs presented for your study are FACTS. They are respectfully presented to you for YOUR consideration.

Please note machine breaking with dandy marks 9:45 a.m. Again at 3:15 p.m. and machine operating safely at a machine head box freeness of S/W 185 seconds including "Fines".

Chart 5

Furnish:

Cover Papers 168½ lb. 24 x 38—500
1100 lb. Blea. sulphite.....Medium strong
410 lb. Soft hardwood.....Weak fiber
150 lb. Clay.....Loading
Glue, Size, Starch.....Colloids

Table 5—Minutes Per Degree of Freeness, Furnish No. 5

Time Period (Minutes)	Sulphite 24	Sulphite 48	Sulphite and Soda 90	Total Degrees Freeness
Beater				
No. 5	2.545	2.341	1.560	74.7
No. 3	1.818	2.330	1.792	67.2
No. 4	3.000	2.758	1.744	68.6
No. 1	3.428	2.891	2.465	53.5
No. 2	2.352	3.637	2.045	61.0

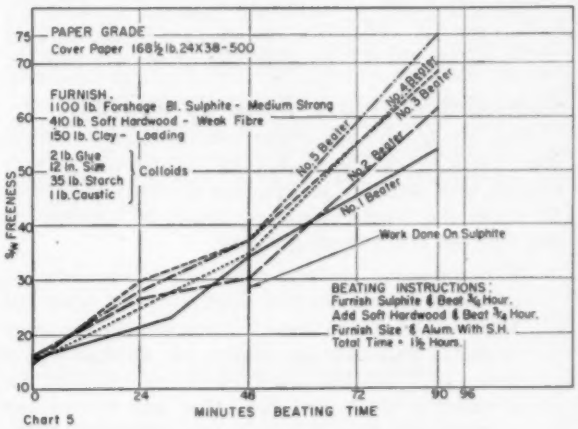
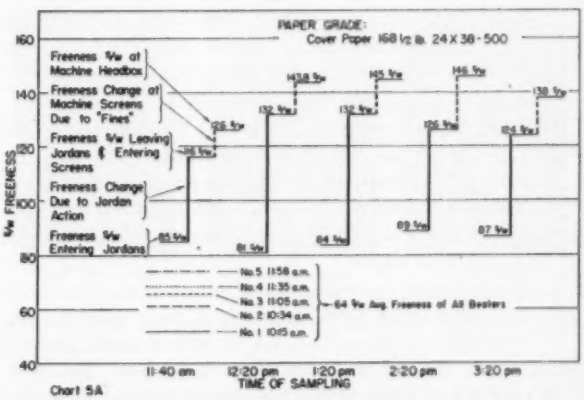


Chart 5


PAPER GRADE:
Cover Paper 168½ lb. 24 X 38 - 500
Freeness % at Machine Headbox
Freeness Change at Machine Screens Due to "Fines"
Freeness % Leaving Jordans & Entering Screens
Freeness Change Due to Jordan Action
Freeness % Entering Jordans
No. 5 11:58 a.m.
No. 4 11:35 a.m.
No. 3 11:05 a.m.
No. 2 10:34 a.m.
No. 1 10:15 a.m.
64 % Avg. Freeness of All Beaters
% FREENESS
TIME OF SAMPLING
Chart 5A

Initial freeness, base furnish, bleached sulphite, S/W 17 seconds. Beating instructions as issued by the production manager: "Furnish sulphite and beat 1 hour. Raise Roll and add soft hardwood. Beat to total time 1½ hours.

As shown in Table 5 and Chart 5, this furnish of 73 per cent medium strong fiber and 27 per cent weak fiber is the least strong furnish of all five selected from a beating point of view. Also the beaters worked on sulphite alone for a period of 68 minutes thus affording opportunity to obtain a fair comparison with the WORK DONE on the No. 1 furnish where the beaters worked on the rag and cotton linters for the full beating time. Of special note is:

1—ALL five beaters produced work done at a more *even* time rate than they did with the stronger furnishes. The stronger the furnish, the wider apart the development rate of the individual beaters.

2—Beaters No. 5 and 3 developed the sulphite to exactly the same total freeness figure at 48 minutes. After the soft hardwood was added, No. 5

developed the total furnish to a slightly higher figure and lower time rate.

3—No. 2 beater "flatted out" between the 24 and 48 minute period and then followed the same rate but with a lower total figure of freeness than No. 3.

4—No. 4 beater had very nearly the same time rate of development as No. 5 with a total figure of 6.3 seconds freeness lower.

5—No. 1 beater developed a far faster time rate on this relatively weak furnish than the work shown for the same beater on the stronger furnishes. This beater is still the least efficient of the five beaters.

Summary of Work Done by Beaters

This study, perhaps better described as a meticulous checking of the work done at definite periods of time with standard instruments specially calibrated to cover the whole operating range of consistency, has evolved the following FACTS:

1—Five standard Holland type beaters, maintained in excellent mechanical condition—all with the SAME in-put power, three of them exactly the same in design and inch bar strokes per minute; one of them with the roll shaft operating clear of the circulating stock, and the other one with 4 per cent more inch bar strokes per minute than the other four—develop the WORK DONE on the furnish at increasingly divergent TIME RATES as the RESISTANCE of the furnish becomes greater.

2—Had these beaters been checked on the No. 5 furnish, 73 per cent sulphite and 27 per cent soda pulp ONLY, we would have to report that the difference in TIME RATE of development and total freeness developed was so SMALL that separate instructions to the beater room would do more harm than good.

3—Speaking of instructions, the study also shows that the operating help carried out their instructions literally as shown in the bleached kraft furnish where the 15 minutes allotted to beat the kraft proved to have negligible results compared to the total work done. Yet the 15 minute instruction was faithfully carried out.

4—The influence of white water in relation to change of total freeness of the stock going to the jordans must be recognized. It is an error to assume that the development of freeness as shown at the jordan inlet is that performed by the BEATING of the stock. We must bear in mind that the work of development performed by the BEATING OF THE STOCK is the MOST IMPORTANT WORK of all stock preparation and the UNIT of measure used to equate this work MUST be clear and NOT confused with other issues.

5—Each MAJOR furnish should be checked in detail for TIME RATE of development by BEATING regardless of the type of mechanical unit used to perform this work. From this check, useful and intelligent operating instructions WITHOUT TOO MUCH CONFUSING DETAIL can be issued to the beater room with the SURETY of good operating results.

6—The development of the BASE furnish is the most important part of the beating operation. Alternatively, where the total furnish is to be beaten off with different types of fibers for the same total beating time, then SEPARATE freeness tests should be taken of EACH type of fiber as standard information BEFORE establishing the INITIAL freeness which forms the base unit from which the WORK DONE is to be calculated.

Chart 5A

No. 5 furnish, bleached sulphite base furnish.
S/W Freeness tests were taken hourly at: (1) Entering the Jordan. (2) Leaving the Jordan, (3) Mixed volume at the machine head box.
Work Done by Stock Preparation Units:
Initial freeness, base furnish: S/W 17 seconds
After BEATING total furnish: S/W 65 seconds
Work done by beaters: S/W 48 seconds
Difference in freeness
by white water dumping: S/W 20 seconds
Entering Jordan: S/W 85 seconds
Leaving Jordan: S/W 126 seconds
Cutting work done by Jordan: S/W 41 seconds
GAIN in freeness by
machine white water "Fines": S/W 13.7 seconds
Average operating freeness on machine wire:
139.7 S/W

As a close to this section of this Five Beater-Five Furnish Study, this writer offers a most interesting comparison between two of three furnishes for the readers consideration. It is on this important matter of FINES carried in the machine closed white water system in relation to the FREENESS of mixed volume whilst the SHEET is actually IN PROCESS OF FORMATION.

Comparison of Two Furnishes in Relation to FINES:

	Soda Pulp	Clay	CUTTING By jordan	GAIN S/W FINES
Furnish No. 4	325 lb.	100 lb.	45.65 S/W	78.5 S/W
Furnish No. 5	410 lb.	150 lb.	41.00 S/W	13.7 S/W

The extra 85 lb. soda pulp and the extra 50 lb. clay much more than offset the difference in WORK DONE by CUTTING—5.65 S/W as shown on the No. 4 furnish. YET the No. 4 furnish shows a freeness GAIN by FINES of 78.5 S/W as compared with the much lesser gain by FINES of 13.7 S/W for the No. 5 Furnish.

The reader will notice on Chart 5A a five HOUR run plotted and the machine was in white water balance and STEADY from 12:20 p.m. to 2:20 p.m. and the paper from this run was of first class quality after the first twenty minutes.

Here we have a factor which is soley concerned with paper machine operation as a mechanical unit as DISTINCT from stock preparation: BEATING or CUTTING to develop certain desired characteristics.

The ream weight and the machine speed are the reason for this wide difference in the amount of Fines passing through the wire mesh into the machine closed white water system. (Incidentally, those of my readers who are in charge of mills where the machine white water system is NOT reasonably closed will do well to ponder the figures of this study in the light of POTENTIAL SAVINGS). The wire MESH is the same in both cases. Machine speed and water turbu-

lence for the light 48¼ lb. sheet. Much lower speed, higher consistency and greater CUBIC MASS of fiber per square inch of wire forming the paper is the answer to the difference in the amount of "Fines" draining through the wire during the process of formation.

Such matters will be dealt with in more specific detail in later writings; they are brought to the reader's attention at this point whilst the graphs, figures and discussion of the BEATING AND CUTTING of the stock comprising these five furnishes for formation into widely different grades of papers are still fresh in the reader's mind.

Quite often, we are compelled to do certain things in proportioning a formulae and allocating the amount and proportion of stock preparation to meet the existing conditions of the paper machine rather than the single condition of development of inherent values to achieve the required specifications. Where a wide range of grades and ream weights are made, we very often have to compromise; settle for wire mesh and felt weave that will be suitable for the grades which represent our highest percentage of monthly tonnage. If any of my readers feel like saying, "Sure that's the way it is in my mill, the salesmen want us to make every grade under the sun"—just think of this one and you will feel a lot easier.

A 72 in. trim fourdrinier machine making 0.009 corrugating medium 90 lb. 24 x 36—500 out of waste paper and old corrugated clippings was sold at a fancy price during the boom period to a group which was hard up for newsprint to make the little funnies. They had on hand three fourdrinier wires MESH 27 x 25. They started to make newsprint on THESE wires and the Superintendent got fired because his FURNISH COST was too high. It's a wonder he got a sheet at all.

Pictured flowsheet on following page shows

How Thilmany processes eight-foot wood

THILMANY'S plant improvement program was outlined in THE PAPER INDUSTRY of April, 1949, with emphasis on the then new No. 10 paper machine. Since that time progress in modernization and improvement have continued unabated. One of the most important additions is the new wood room herein described. Work is progressing on numerous other projects including a new brown stock washing system, turbine room, No. 11 paper machine and a new asphalt paper processing building.

Designed to handle eight foot wood instead of four foot lengths, the new wood room at Thilmany achieves savings estimated at $100,000 per year. The streamlined layout, together with new equipment, has made it possible to supply chips for the pulp mill in two shifts instead of three with consequent savings in labor. The new chipper has practically doubled chip production over the old installation and more uniform quality chips have effectively increased the yield per digester. Less waste results from reduced saw kerf, fewer end chips and reduced brooming of log ends. Only one other mill in the country (on the West Coast) processes eight foot wood in a drum barker system.

Wood, in eight foot lengths, is dumped in the new hot pond, 250 ft. long by 50 ft. wide and rectangular in shape. The pond is divided most of its length into two sections by a hollow midfeather which acts as an inlet to the Bingham axial flow, 6000 gpm. recirculating pump at the end of the pond. The pond extends into a tapered section or throat that leads to the jackladder. Here the wood is lined up so it will be readily picked up by the jackladder.

About 1500 gpm. of condenser water from the black liquor evaporators supplies the hot pond. This water is about 70 F. and even over extended winter shutdowns such as Christmas holidays with temperatures to 20 F. below zero there is no need to add steam to prevent freezing. Normally wood is held in the pond from 2 to 4 hours. This soaking softens the bark and removes much dirt and in the winter thaws the ice and snow from the wood.

Wood from the jackladder discharges direct into the 12 ft. dia. x 40 ft. long Fibre Making Processes, Inc. chain suspended drum barker. Bark, removed from the wood by the rolling and tumbling action, drops through the slots in the barker shell onto the sloping side of a conveyor running parallel to the barker and which discharges to a bark shredder. Shredded bark is blown to the broiler room. Clean barked logs exit from the drum onto a 36 in. conveyor belt.

Three of the men back of Thilmany's progress.

C. R. Seaborne
exec. vice pres.

A. M. Schmalz
production mgr.

P. H. West
pulp mill supt.

Barking of eight foot wood in a drum barker is not common and Thilmany has installed the first such operation in the midwest. Even in the south most wood operations handle wood of five foot lengths or less. In the drum barking operation, eight foot wood tends to roll rather than tumble and there is less brooming of ends.

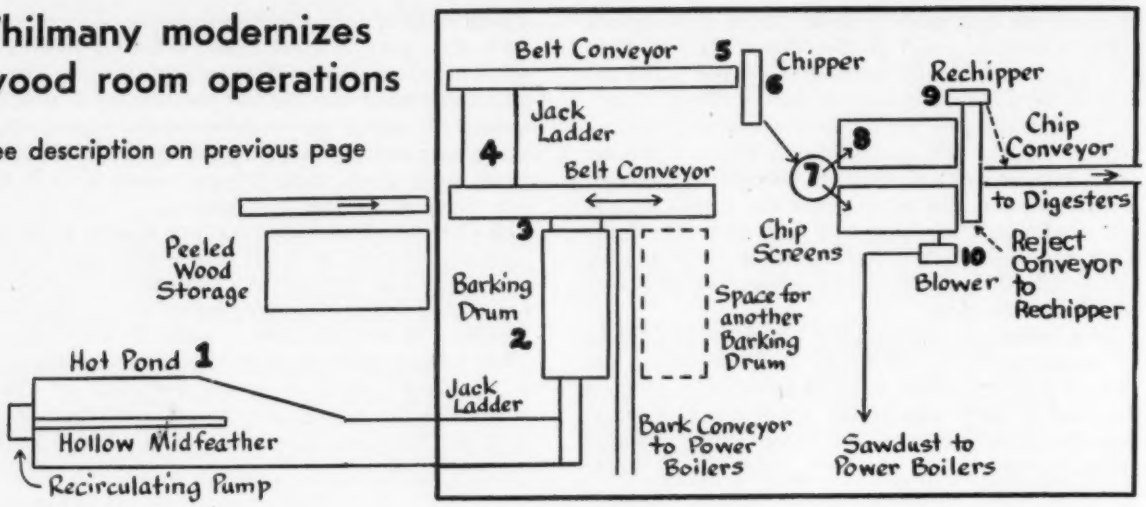
Barked wood from the belt conveyor is fed manually to a jackladder that discharges to the chipper feed conveyor, both of which are synchronized in speed so that logs are fed singly end for end into the chipper spout.

Twenty cords per hour of logs are fed through the 19 in. dia. spout of the new 88 in. disk, 10-knife Murray chipper. The chipper rotates at 360 rpm., driven by a direct connected 600 hp. Westinghouse synchronous motor. The chipper disk has blades on its periphery which act as a fan and blow the chips to a cyclone receiver above the chip screens.

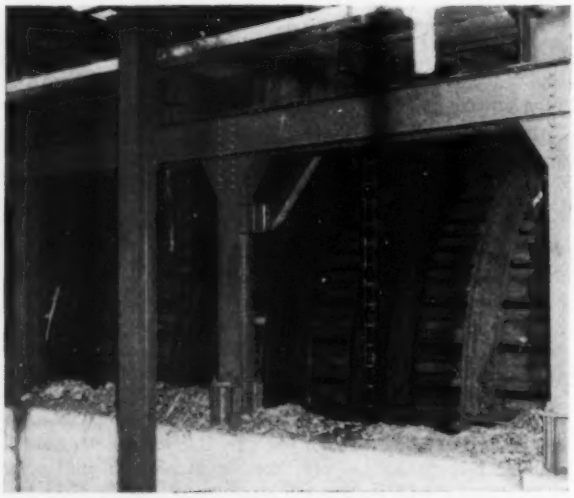
Accepted chips from the two Murray shaker screens discharge direct to the belt conveyor leading to the digester room. Oversize chips from the coarse screen fall on a 12 in. lateral conveyor belt which feeds the 36 in. disk, 4-knife Murray rechipper. This unit, also with peripheral blades on the disk, blows the chips to a small cyclone above the chip belt conveyor. Sawdust and fines from the screen drop into hoppers and are blown through a duct direct to the boiler house. The top deck of the 5 ft. x 14 ft. screens consists of square perforated sheet metal and the lower deck is woven wire. Wood and chip conveying equipment was supplied by Link-Belt Co.

Thilmany modernizes wood room operations

See description on previous page

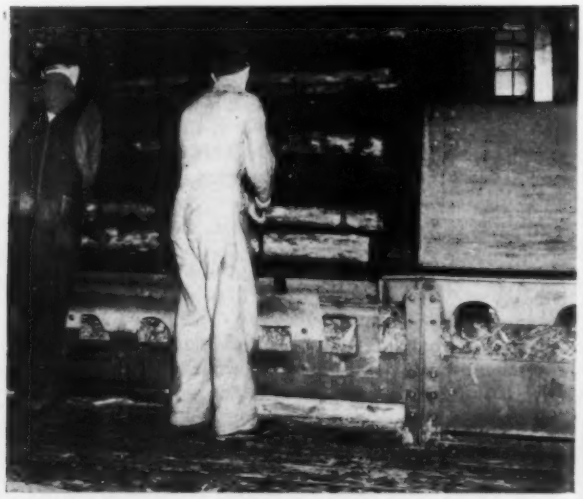


1. Hot pond in front of woodroom; new power house at right



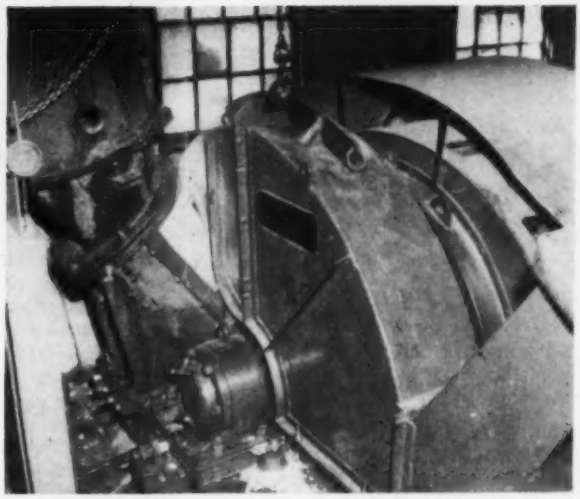
2. New F M P chain suspended drum barker

3. Eight foot wood discharges onto conveyor belt

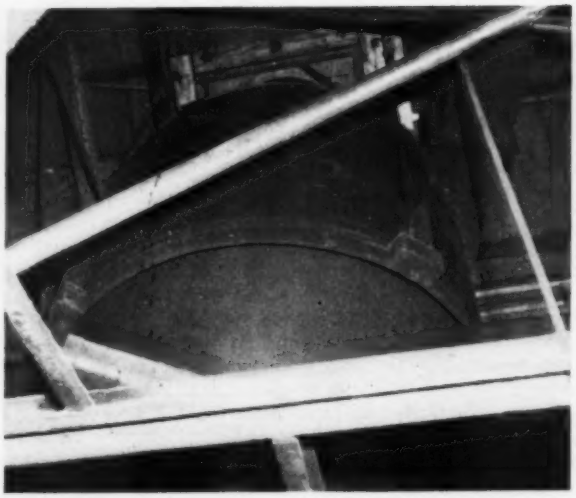


4. Jackladder takes wood to the chipper feed conveyor

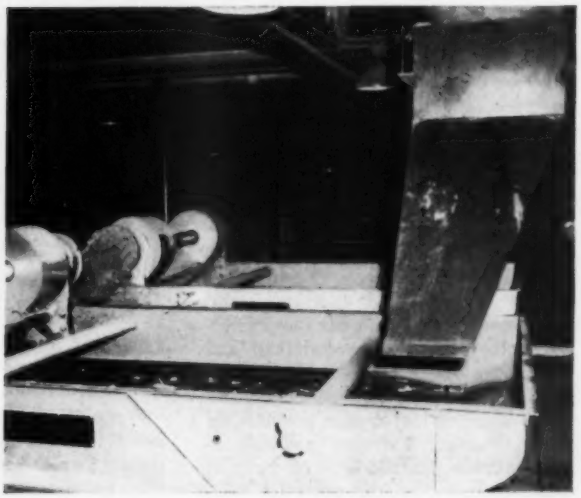
5. Log entering chipper spout



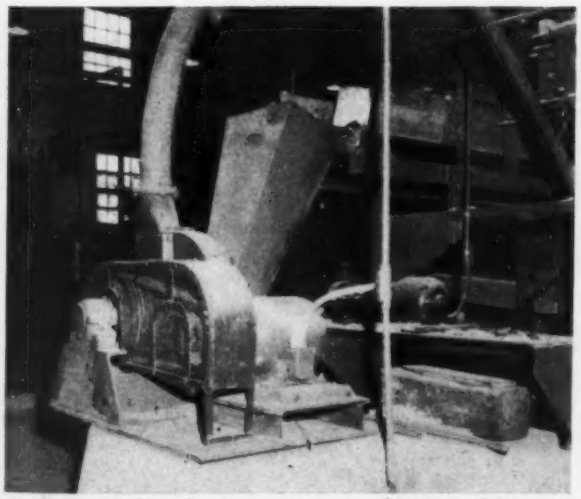
6. Feed spout (left) and discharge duct (right) of the 10 knife Murray chipper



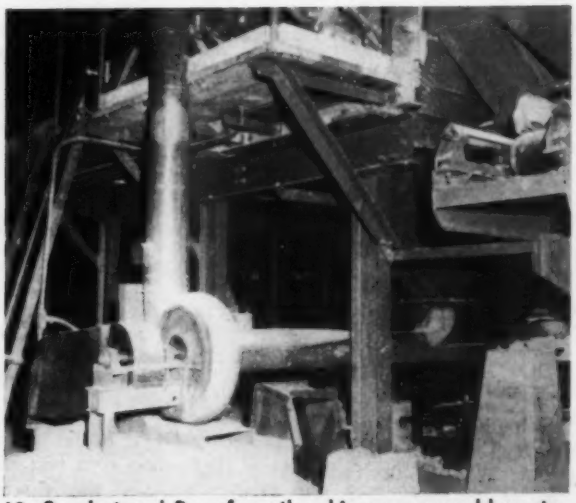
7. Overhead cyclone receives chips and feeds screen



8. Two Murray shaker type chip screens



9. Oversize chips from screens go to this 36 in. Murray rechipper



10. Sawdust and fines from the chip screen are blown to the power boilers

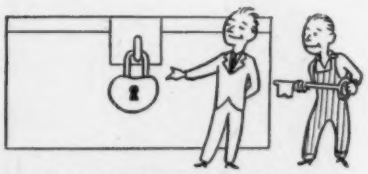
Gardner brightens up union contracts

Straight-forward language plus descriptive cartoons improve readership of labor-management agreements. Result: more understanding, less misinterpretation.

TRADITIONALLY FOREBODING APPEARANCE of union contracts has been discarded by Gardner Board and Carton Co. in an effort to attain the best possible management-employee relations.

UNION RECOGNITION

With the knowledge that any contract loses much of its meaning and effectiveness if not read and understood, the Middletown, Ohio, firm has continued a movement that began several years ago to remove from collective bargaining agreements all barriers to readability. As much legalistic language as possible has been removed. Cartoons and photographs break the monotony of 37 typewritten pages. And the result has been highly encouraging, as demonstrated by the comment from both employees and labor relations specialists, who have hailed the contract as a further step toward harmony between management and worker.



IT'S EASY TO REOPEN THE CONTRACT

In its 1951 agreements with Local 1009, United Paperworkers of America (CIO), and the United Independent Paper Workers at its plants in Middletown and Lockland, Gardner has produced a document with eye-appeal and readability. The various sections of the contract are introduced with cartoons and photographs, which tell at a glance the subjects covered in the many separate articles. The result is two agreements that workers say they can thumb through easily—and understand.

The opening pages include photographs of plant managers and union presidents, the bargaining committee, scenes at the plant. And the color cartoons depict the different phases of agreement. The contracts are printed in larger type and are bound in the standard form of a legal document. Already the Gardner experiment has drawn numerous queries from other companies, while the employee reaction has been good. As one worker put it, "The contract looked so unusual, I had to go through it."

GETTING AHEAD

Naturally the agreement contains each and every item of bargaining that is included in the standard union contract. But, the presentation differs from the traditional as black differs from white. George E. Bradford, president of the United Paperworkers of America, says, "The contract is more readable in its present form and has aroused a great deal of comment among employees."

And Robert L. Miller, president of the Independent Union, declares, "I have been in union work for eight years and have had and read several contracts, but find none that compares with this one as to simple explanation and fairness both to employees and employer." Similar comments have been heard from many of the firm's more than 2,000 workers.

MILITARY SERVICE, LEAVES OF ABSENCE

QUALIFICATIONS, NOT APPLE POLISHING, IS WHAT COUNTS

Engineering the break with old-style legalistic and overly wordy agreements was Richard L. Siegel, director of industrial and public relations for Gardner. Not an overnight development by any means, the new style contract has been the aim of management and labor at the Ohio firm for several years. Chief target of the concerted effort was the simplification of the wording of agreements. And, according to Mr. Siegel, employee readership has increased from "practically nil" to "good."

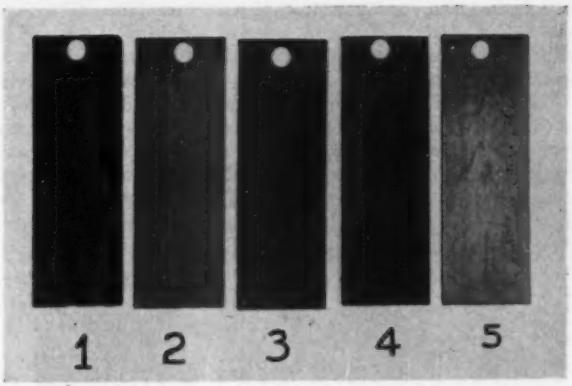
REDUCTION OF WORKING FORCE: SENIORITY COUNTS

The document has been well indexed for quick reference. It is hoped that by thus aiding the employee in easily finding any desired information many grievances will be avoided—grievances that are usually caused by nothing more than ignorance of the contents of a contract.

A Cincinnati advertising agency (Stockton, West & Burkhart, Inc.) handled the format and art work for the final version of the contract.

TERMINATION OF AGREEMENT

How to protect your stand-by boilers



Test strips indicate degree of corrosion

R. B. CONLAN
W. H. & L. D. Betz

Metal surfaces of idle boilers should be protected from corrosion during any standby period. The method to be used will depend upon the length of time the boiler is to be idle, convenience of the storage method, cost of the protective materials and whether or not the unit will be required for emergency service. Under any conditions, the method to be employed shou'd be selected in advance and the protective materials should be on hand when the boiler is taken off the line.

Proper procedure should be employed in removing a boiler from the line when it is to be taken out of service and stored. Care should be exercised that any suspended solids or mud present in the boiler be prevented from baking on the heating surfaces. A boiler never should be drained without immediately washing the unit while there is still sufficient heat to bake sludge on the boiler tubes.

Dry Storage

Two general procedures, dry storage and wet storage, can be employed in laying up idle boilers to protect the metal surfaces from corrosion. Dry storage of a boiler is recommended when the unit is to be out of service for a period longer than one month and when sufficient time will be available in preparing the unit for further service. This method is also suitable for use in locations where freezing temperatures may be expected during the stand-by period.

Use of Quick Lime—A boiler to be stored by the dry method should be thoroughly dried internally by means of hot air stoves or a light wood fire. Water tight trays of a moisture absorbing material, such as quicklime, should be placed in the boiler immediately after the drying-out process. Quick lime requirements will approximate 30 lb. for each 100 boiler hp. With a regular HRT or locomotive type boiler, a single tray of quick lime resting on the top of the flues or in the bottom of the shell will be adequate. In water tube boilers a tray of quicklime should be placed in each drum.

When the quicklime has been placed in position, the manheads, handholes and all connections on the boiler should be tightly blanked or closed to exclude air as much as possible. After a period of three or four months the boiler should be opened and examined. The supply of quicklime should be replenished if it has deteriorated.

Use of Adsorbents—Recently adsorbents have become available in convenient containers suitable for use in dry storage of boilers. These materials have the ability to condense water vapor in their internal surfaces without themselves being changed either chemically or physical. Silica gel (cilicon dioxide) and alumina (aluminum oxide) are examples of materials containing a vast number of sub-microscopic pores and great internal surface area to which water adheres or is adsorbed.

Adsorbents are more conveniently handled than quicklime and give very satisfactory results. Silica gel is prepared in package form for use in storage of idle boilers. The packages of material should be well distributed throughout the area to be protected. It is suggested that approximately 4 lb. of silica gel be employed for each 100 cubic feet of air space. However, it would be advisable to obtain specific recommendations from the manufacturer of the product.

Wet Storage

Wet storage is desirable where boilers are to be left idle for a period longer than a week and when plant operating conditions demand emergency service. This method is not applicable where freezing temperatures may be expected during the period of standby. The boiler to be stored should be taken off the line properly, thoroughly cleaned, inspected for tight connections and filled to the normal operation level. This should be followed by a short and light steaming period during which the unit is vented to the atmosphere to expel the dissolved gases released from the water by boiling.

Use of Sodium Sulphite and Caustic Soda—The most common materials employed for wet storage are sodium sulphite and caustic soda. Sodium sulphite acts as an oxygen scavenger, minimizing corrosion during the storage period while caustic soda will maintain the desired alkalinity. Following the short, light steaming period the water should be made alkaline in excess of 400 ppm by addition of caustic soda. The quantity required will approximate 3 lb. for each 1000 gallons of water in the boiler. Sufficient sodium sulphite should be added to produce a minimum residual sulphite concentration of 100 ppm. This feed will approximate 1.5 lb. for each 1000 gal. of water in the boiler. The solution may be added directly to the boiler through the regular chemical feed line, if available. Otherwise, the materials can be introduced by "shot" feeding through the boiler feed line during filling of the unit or by adding through a manhole before closing the boiler.

After the boiler has cooled somewhat, but before a vacuum is created, the unit should be filled to the top and throughout the superheater. All connections should be tightly closed. Since corrosion is promoted by lukewarm water, the water in the boiler should be kept as cold as possible. For this reason, feed valves and all steam connections should be tight at all times. At weekly intervals, tests of the water should be made and the alkalinity and sulphite concentrations increased if necessary to maintain the recommended values.

It is often desirable to suspend test strips at various locations in the boiler. Examination of these specimens at monthly intervals, after the water level has been lowered by blowdown, will give an indication of the protection obtained. These specimens can be replaced and the boiler refilled after the necessary amount of caustic soda and sodium sulphite has been added. If it is necessary for such an idle boiler to be returned to

service, the boiler should be blown down well before placing on line in order to reduce the boiler water alkalinity and prevent carryover.

The illustration shows varying degrees of corrosive attack on test strips. Specimen 1 illustrates attack typical of wet storage without chemical treatment. Corrosion products cover almost the entire surface. Specimen 2 illustrates conditions with the proper maintenance of the recommended caustic soda—sodium sulphite concentrations. Specimens 3 and 4 show strips where caustic soda—sodium sulphite were used initially, but proper concentrations were not maintained as treatment was depleted. Specimen 5 is a sample test strip before exposure and is included for purpose of comparison.

Use of Chromates—In some instances chromates have been used as protective agents for idle boilers. Chromates inhibit corrosion through the formation of a thin continuous passivating film on the metal surfaces. When a boiler has been thoroughly cleaned, inspected and filled to normal operating level, sufficient chromate should be added to establish concentrations (as CrO_4) between 500 and 1000 ppm. A small amount of chromate will be consumed in forming the protective film and in the oxidation of reducing substances present in the water. After the protective solution has been added, the boiler should be filled to the top and throughout the superheater. Good mixing can be obtained by circulating the solution with a pump.

While sodium chromate (Na_2CrO_4) may be used for wet storage, it is generally more economical to employ technical granular sodium dichromate ($Na_2Cr_2O_7.2H_2O$) which is more readily available. Since a solution of sodium dichromate is acidic, however, it is necessary to adjust the *p*H by the feet of caustic soda. The addition of caustic soda to sodium dichromate forms sodium chromate in accordance with the following equation:

$$Na_2Cr_2O_7.2H_2O + 2NaOH = 2Na_2CrO_4 + 3H_2O$$

For each 100 lb. of technical sodium dichromate approximately 27 lb. of caustic soda will be required to give a *p*H value between 7.5 and 9.5 The choice between the use of sodium chromate and sodium dichromate for boiler storage, however, is one of economics and convenience. It is important to realize, however, that chromate is a toxic chemical.

Other Methods of Protection

Protective coatings and paints have also been employed in the storage of idle boilers. In most cases, however, these have been applied to the boiler metal surface to give an added factor of safety. In the storage of idle boilers protective coatings should not be relied on solely, but should be employed in conjunction with one of the regular chemical methods of storage. If the protective coating is porous or is not continuous over the entire area, corrosion will develop unless one of the chemical methods of protection is also employed.

It has been reported that ammonia gas was used in Germany for the protection of boilers which were to remain idle for a considerable period of time. After removal from the line, the boiler is thoroughly dried and ammonia gas is added from a cylinder. The boiler is then sealed hermetically. The ammonia gas will react with any moisture present, thus offering protection. It is reported that a boiler stored in this fashion can be placed in service again by completely filling with water to drive out all of the gas. When the quantity of water above the normal operating level is removed, the unit can be started in the normal fashion.

Paper Mill Power—Part VI

Turbine drives for paper machines

DAVID MOFFAT MYERS
Myers & Addington, New York

IN OLDER MILLS, it was common practice to operate each paper machine with its own individual steam engine drive, the exhaust of the engine going to the driers. Since the heat supply to the engine was efficiently utilized, a good heat balance for that unit was effected.

Today's improvement on this system substitutes a turbine for the engine, thus eliminating oil from the exhaust; and with modern design of electric governors, provides extremely accurate speed control and regulation for a line shaft driven paper machine.

Such turbines with necessary reduction gear are operable at much higher steam pressures and temperatures than the old steam engines, which means that more power can be obtained as by-product of the process steam in the plant as a whole.

Such turbines are also available at low and medium pressure so they may fit economically into a heat balance which provides steam from extraction of high-pressure turbine-generators located in the central power plant of the mill.

In the first condition mentioned, the heat flow diagram is shown in Fig. 1, wherein the paper machine turbine receives its steam supply direct from the boilers.

The second condition is shown in Fig. 2, in which the paper machine turbine is supplied with steam from the extraction of one or more of the main turbine-generators in the central power house.

In each of the above arrangements, the steam produced by the boilers has undergone the same range of expansion down to the terminal pressure required. Therefore, ideally speaking, the overall economy would be the same. Actually, however, certain other factors affect the result.

In the layout of Fig. 1, the No. 4 turbine would have a lower steam rate than in the design of Fig. 2. Also, Nos. 1 and 2 turbines in Fig. 1 would deliver a little more electrical energy per pound of steam supply than the corresponding automatic extraction units of Fig. 2.

The latter design may often work out very well and economically in cases wherein improvements are to be applied to an existing plant which already has a direct turbine drive at a low boiler pressure of say 200 psig. Such a turbine can be retained in service and supplied with extraction steam from new main turbines receiving high-pressure steam from new boilers.

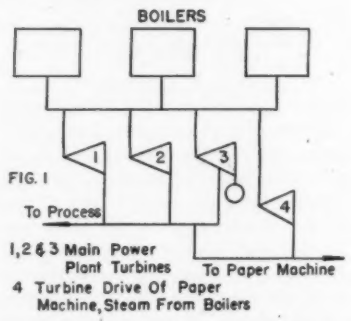


Fig. 1—Paper Machine drive turbine receives steam direct from boilers

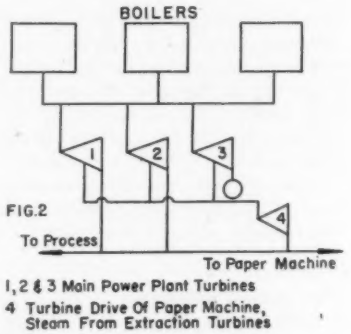


Fig. 2—Drive turbine gets its steam from extraction turbine generator

While heat balance is a vital factor in the power supply of a paper mill, there are other important factors relating to production which may determine the type of paper machine drive to be adopted.

These include line shaft motor drive with special controls, and the modern sectional electric paper machine drive. Both have the advantage of deriving their energy supply from larger turbine-generators, with their higher efficiency, located in the central power house.

Against the credit of such gains, there must be charged the added electrical losses occasioned by the several units in the system of generators and motors.

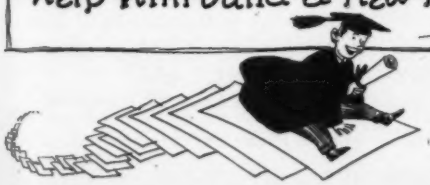
Debited against the direct steam-turbine paper mill drive would be such efficiency losses as may occur due to throttling action. No hard and fast rule can be laid down. Each case must be decided on its individual merits.

PAPER SKETCHES

To obtain enough copper for casting images of Buddha the Chinese government in 807 a.d. requested all merchants to exchange copper coins for paper money.

During England's "Black Plague" in 1636, rag-collecting was banned, necessitating the temporary closing down of paper mills.

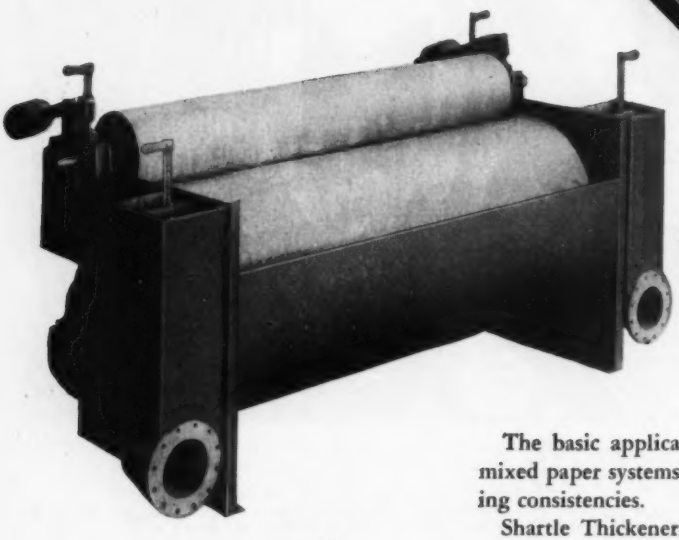
In 1701 when a flood carried away this country's first paper mill, William Penn asked the neighbors of William Rittenhouse, its owner, to help him build a new mill.



48 pounds of paper forms are used by the Pratt Institute of Brooklyn to carry a student through graduation.

SHARTLE THICKENERS

Air-Couch Type



Couch Roll Type

The basic application of the Shartle Thickener is in mixed paper systems to thicken cleansed stock to jordaning consistencies.

Shartle Thickeners are also employed to thicken for refining—to thicken for bleaching—and to thicken for economical storage and handling of stocks of many different grades.

They are also used as stock washers—to wash de-inked and bleached stocks.

Shartle Air-couch and Couch Roll type Thickeners are different—both incorporating improved features of more than passing interest.

Mold diameters 36" to 60"
Face length range 60" to 136"
Get construction features
contact Shartle

SHARTLE BROTHERS MACHINE COMPANY
MIDDLETOWN, OHIO

DILTS MACHINE WORKS, Fulton, New York
Divisions of THE BLACK-CLAWSON CO., Hamilton, Ohio
Western Sales Office: Mayer Bldg., Portland, Oregon
Southern Sales Office: 937 Coventry Road, Decatur, Georgia

Associate: THE ALEXANDER FLECK LTD., Ottawa, Canada
Subsidiary: B-C INTERNATIONAL, LTD., Greener House, 66/68 Haymarket, London, S. W. 1, England

The Paper Industry Association News

NORTHWEST SUPTS. shoot clay pigeons while relaxing during their annual fall meeting; Frank Libby of K.V.P. (second from right) had highest score.

Technical Topics Featured by Northwestern Supts.

Nearly 250 members and guests attending the fall meeting of the Northwestern Division of the superintendents association heard technical papers presented by authorities on various phases of papermaking. The two-day gathering, held September 14 and 15 at Northern Holiday Resort in Marinesco, Mich., also featured election of division officers.

Paul West of Thilmany Pulp & Paper Co. discussed barking and chipping of eight-foot pulpwood. The advantages of new methods used in Thilmany's wood room were described. A second paper, presented by Bruce Armstrong of Jackson & Church Co., discussed the operation of a pulp press produced by that firm. Described were applications of the screw press for deinking, high density bleaching, screening bleached groundwood and semichemical neutral sulphite, and extracting the water from the pulp.

Also presented during the technical session was a paper by Paul Boronow of Valley Iron Works on paper formation and the operation of the Valley inlet. The speaker described different types of slices, the principles and effects of slow directions onto the wire, along with the significance of length of apron with respect to the position of the top slice.

New officers elected during the business session were: Paul H. West, Thilmany Pulp & Paper Co., chairman; L. W. Murtfeldt, Consolidated Water Power & Paper Co., first vice chairman; Myles W. Reif, Blandin Paper Co., second vice chairman, and Gus Klaus, Northern Paper Mills, secretary-treasurer. Henry Baldwin of Consolidated Pulp & Paper Co. was elected a trustee.

The program also included golf, fishing, trap shooting, card parties, a fish fry, barbecue, and dancing.

Delaware TAPPI Announces 1951-1952 Program

Guided tours through the W. C. Hamilton & Sons fine paper mill at Miquon, Pa., were to be featured at the September 21 meeting of the Delaware Valley section of TAPPI. Also scheduled for this gathering, the first meeting of the fall and winter season, was a panel discussion to be staged at the Engineer's Club in Philadelphia. The announced subject was, "Recent Trends in Fourdrinier Machine Practice," with Romeo Tourangeau of W. C. Hamilton & Sons as moderator.

Programs for the remaining section meetings are as follows: October 25, "Technical Control of Machine Production," P. H. Nethercut, Scott Paper Co.; November 29, "Color Engineering, Paint for Safety and Efficiency of Paper Production," L. E. Whitmayer, E. I. duPont de Nemours & Co.; January 24, "Development of New Products for the Paper Industry," Dr. A. L. M. Bixler, Riegel Paper Corp.; March 27, 20th anniversary meeting, "Historical Background of the Section," E. J. Albert, Thwing-Albert Instrument Co., and "Development of TAPPI and Local Section," K. P. Geohegan, Aetna Paper Co.; April 24, "Mill Management," H. H. Hanson, W. C. Hamilton & Sons, and May 22, E. J. Albert Award Program, presentation of papers.

New York-Canadian Supts. Elect 1951-52 Officers

More than 100 members and guests attended the annual fall meeting of the New York-Canadian Div. of the superintendents association which was held September 6-8 at Saranac Inn, Upper Saranac Lake, N. Y. During the regular business sessions C. E. Cole, Mutual Box Co., Utica, was elected chairman for the coming season. He succeeds Harry S. Cutler of United Board & Carton Corp., Lockport, N. Y.

Technical sessions held during the gathering covered a variety of subjects, including fine paper and tissues, paperboard and felt, and pitch. It was announced at the meeting that Ciba Co. has offered to donate a sterling silver golf trophy, together with a prize of $20, to the winner of the division's annual tournament.

Other officers elected at the meeting included: C. B. Davis, E. B. Eddy Co., first vice chairman; C. E. Reynolds, Armstrong Cork Co., Inc., second vice chairman; R. E. Gray, Gotham Paper Mills, Inc., third vice chairman; H. A. Horstmann, General Dyestuff Corp., continuing as treasurer, and R. S. Greene, H. Waterbury & Sons Co., secretary.

Northeastern Superintendents Hold Annual Fall Meeting

Papers on technical aspects of paper mill operations highlighted the annual fall meeting of the Northeastern Division of the American Pulp and Paper Mill Superintendents Association, which was held September 14-15 at Poland

Spring, Maine. Officers for the 1951-52 year were chosen at a business session that followed the discussion period.

In a discussion of the pressure inlet for Fourdrinier machines, D. R. Simonds of Beloit Iron Works, Beloit, Wis., declared that the chief problem in designing an inlet concerns the whole range of flows that are encountered. He listed the common requirements of an inlet as: (1) minimum downtime for washups; (2) accessibility for cleaning; (3) ease and effectiveness in making adjustments; (4) freedom from corrosion; (5) compactness, and (6) uniformity of delivery.

The second speaker, A. E. Bachman, vice president and general manager of Missisquoi Corp, Sheldon Springs, Vt., explored the realm of the technical man and the practical man. Citing developments brought about by technicians alone and some evolved by practical engineering, he concluded that human engineering is a job for the practical man, but that the practical man in carrying out his duties must collaborate extensively with the technical man.

Newly elected officers are as follows: James M. Wishart, Oxford Paper Co., chairman; T. M. Barry, Hollingsworth & Whitney Co., first vice chairman; Frank B. Harlow, Penobscot Chemical Fibre Co., second vice chairman; Harvey H. Wilson, Ryegate Paper Co., third vice chairman, and Mrs. Marion L. Stewart, Lincoln, N. H., secretary-treasurer.

John Coppens, Fraser Paper Ltd., Madawaska, Maine, retiring chairman, presided at the morning session; A. F. Tolland, Oxford Paper Co., Rumford, Maine, served as moderator of the discussion.

HEAD TABLE PERSONALITIES at Chicago TAPPI meeting are (L. to R.) A. Newell Rumpf, Harris Trust Co.; Peter Trucano, Morris Paper Mills; V. V. Vallandigham, Kelco Co.; George Zinkil, Central Fibre Prods. Co.; M. G. Kuhlman, Fleming & Sons, Dallas; J. R. Fulghum, Socony-Vacuum Oil Co., and C. Krebs, Atlas-Boxmakers Inc.

Paper Industry Economics Discussed at Chicago TAPPI

The general stability of the paper industry, coupled with its recent expansion and modernization, places it high on the list of those industries presenting sound investment risks. This view was expressed by A. Newell Rumpf, vice president of the Harris Trust Co., Chicago, in an address before the opening session of Chicago TAPPI's 1951-52 season.

Prior to the principal address, officers for the current year were announced. Chairman is V. V. Vallandigham, Kelco Co.; vice chairman, A. Duetsch, Container Corp.; secretary, C. Krebs, Atlas-Boxmakers, Inc., and treasurer, J. R. Fulghum, Socony-Vacuum. The group meets on the third Monday of each month.

Clinton K. Royce, head of the packaging section of the Office of Navy Material, Washington, D.C., will speak on "Military Packaging" at the Chicago group's next meeting, to be held October 15. His address will be preceded by a motion picture on naval packaging.

Declaring that the banker's interest naturally lies in the financial welfare of a firm from the investment standpoint, Mr. Rumpf told the 76 members and guests attending the dinner meeting that the paper industry has in the past few years undertaken expansion plans equaled by few industries in the United States. Since 1945 the productive capacity of paper manufacturers has increased from 19,400,000 tons to 25,500,000 tons. During the same period the capacity buildup in the steel industry has amounted to 8,700,000 tons. Percentagewise, however, the paper increase of 31.4 per cent far outshadows the 9.1 per cent recorded by steel.

Four primary considerations must be made by any successful banker before granting any industry a short- or long-term loan: (1) character and ability of management; (2) financial assets; (3) operations, and (4) prospects.

The stability of industry is of primary concern to any loan banker. Figures for 1950 demonstrate stability in the paper manufacturing field. Last year printing and publishing consumed an estimated 10,000,000 tons of paper (including imported newsprint). An additional 13,500,000 tons were used in packaging, while 1,500,000 tons were consumed in those papers dealing with sanitary functions. And almost 4,000,000 tons were utilized in building, mechanical, and other paper classifications.

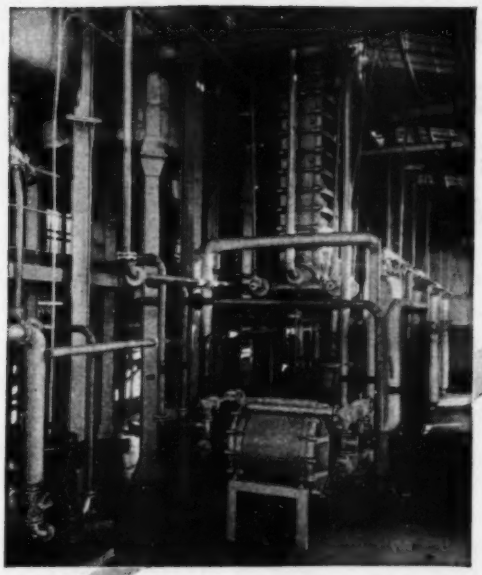
The paper industry will be producing about 7 billion dollars worth of goods this year. Employment is currently running at 209,000 workers, exclusive of salaried individuals and those employed in the woods, with the present annual payroll approximating $765,000,000. As far as total assets are concerned, reliable sources indicated an industry figure of close to 5 billion dollars at the close of 1949. And in all probability new capital and retained earnings invested in property has increased this figure to close to 5¼ billions at the present time, a substantial increase over the 2.97 billions at the end of World War II.

Capital requirements for entering into the paper industry are very large. Pulp mills cost in the neighborhood of $70,000 per ton capacity, and a 200 to 300 ton mill is necessary in most instances for economic operation. An example is the proposed National Container Co. kraft mill that is to be built in the South. The cost is expected to be approximately $23,000,000 for a 500-ton capacity.

Major factors in the overall investment picture are large capital outlays plus substantial lease obligations for the fully integrated operator with access to timberlands. These are fixed costs. The paper industry has the largest investment cost per worker of any industry in the country. And profits vary considerably with the rate at which wood mills are operating, with 80 per cent given as the minimum rate for economical operation.

Consumer demand is vital in any field. On a basis of orders received since mid-1949 it can be established that paper production has not been sufficient to meet consumption and, therefore, it appears that paper production in general can justifiably be maintained at high levels. However, in view of the fact that production has exceeded basic demand for the most part since mid-1949, it would seem significant that an ultimate adjustment is in the offing. Therefore, the conclusion must be that paper production should continue at high levels over the short term, but that, unless a significant change takes place in the form of an upward spurt in basic demand, production might have to level off within the next year or so.

There appear to be few, if any, definite trends in profit margins for paper industry operators. The margins of the major companies have, for the most part, fluctuated somewhat in line with sales volume. Low sales volume in 1938, 1945, and 1949 were all accompanied by



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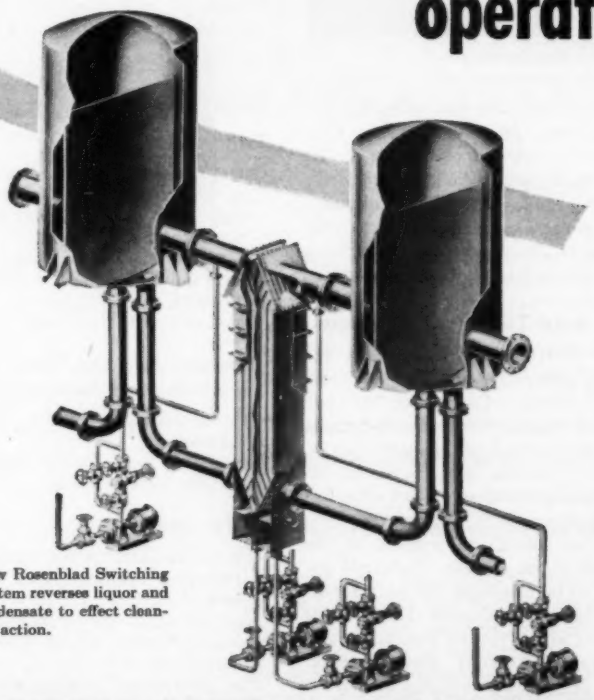

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lower than average margins for most companies. Peak margin years, on the other hand, were in 1941 and 1948, both years of high production and sales.

The rate of return (after taxes) on stockholder investment in paper and allied product firms compares favorably with other industries. A study made by the Federal Trade Commission reveals that 103 corporations showed 9.6 per cent in 1940, 21.1 per cent in 1947, 18.2 per cent in 1948, 12.1 per cent in 1949, and 16.1 per cent in 1950. Only six industries showed a better rate of return than paper firms.

One element of profit usually forgotten by industry and consumer alike is the customer's profit. Industrial profit is gained by selling a product for more than its cost of manufacture. But if the product sold isn't worth a lot more to the buyer than what he paid for it, the manufacturer will soon be bankrupt. The amount more than a product is worth to the consumer than what he paid for it is the customer's profit. And the customer's profit is industry's profit.

Chicago TAPPI
has announced that "Greaseproof Papers and Films" will be the subject of an afternoon and evening meeting to be held November 19 at the Chicago Bar Association. Speakers include Robert Erickson, Erickson Research Laboratories, who will discuss formulations; Thomas Luey, Sutherland Paper Co., theories of coating applications; L. E. Whitmore, Bakelite Co., polyethylene liners, and M. L. Downs, of Thilmany Pulp & Paper Co., glassine papers and laminations. The speaker at the evening banquet has not as yet been announced.

SPE to hold Technical Sessions

More than 1,000 delegates are expected to attend the eighth annual National Technical Conference of the Society of Plastics Engineers, which is to be held in Chicago January 16-18, 1952. The meeting is to be sponsored by the Chicago section.

The gathering will feature the presentation of awards to winners in the SPE prize paper contest. Technical papers are to be presented during the program, which will examine the vital role of plastics in the present emergency and in the national economy. Eminent speakers will address the morning and afternoon technical sessions, with luncheon and dinner banquets also on the schedule.

Packaging Institute to Hold Annual Forum

The 13th annual Forum of the Packaging Institute is to be held October 22-24 at the Hotel Commodore, New York, N. Y. Users, suppliers, equipment builders and designers from throughout the United States are expected to attend.

The meeting will open with general and business sessions on the first day. Among the scheduled events are an address by the president of the Institute, Charles O. Kendall; a panel discussion on the problems of military packaging, and a discussion on the problems of government controls with Charles A. Lewis, acting chief of the containers and packaging division of the National Production Authority, serving as chairman.

Technical sessions are to be held on Tuesday, with the subjects to be discussed as follows: printing, package evaluation, package and container evaluation, food packaging, and drug and pharmaceutical packaging. Seminars to be staged Wednesday will cover production and petroleum.

TAPPI Strawboard Meeting Cancelled

There will be no fall meeting of the Fibrous Agricultural Residues Committee of TAPPI. This was decided by a majority vote of the committee membership. The round table discussion on strawboard mill problems, originally scheduled for this meeting, will be held during the annual TAPPI convention, which is to be held in New York, N. Y., in February.

Coming Events

TAPPI meetings

Oct. 15-18—Sixth Engineering Conference of the Pulp and Paper Industry, General Oglethorpe Hotel, Wilmington Island, Savannah, Ga.
Oct. 25-26—Plastics Conference, New York State College of Forestry, Syracuse, N.Y.
Feb. 18-21, 1952—Annual meeting, Commodore Hotel, New York, N.Y.

American Pulp and Paper Mill Superintendents Association meetings

Oct. 18—Michigan Division, Hotel Harris, Kalamazoo.
June 17-19, 1952—Annual meeting, Book-Cadillac Hotel, Detroit.

Other meetings

Oct. 22-24—13th Annual Forum of the Packaging Institute, Hotel Commodore, New York, N.Y.
Nov. 26-Dec. 1—23rd Exposition of Chemical Industries, Grand Central Palace, New York, N.Y.
Dec. 2-5—Annual meeting, American Institute of Chemical Engineers, Atlantic City, N.J.
Jan. 14-17, 1952—Plant Maintenance Show and Conference, Convention Hall, Philadelphia.
Jan. 23-25—Canadian Pulp and Paper Association, Technical Session, Mount Royal Hotel, Montreal, Que. (annual meeting).
June 23-25—Forest Products Research Society, Milwaukee (annual national meeting).

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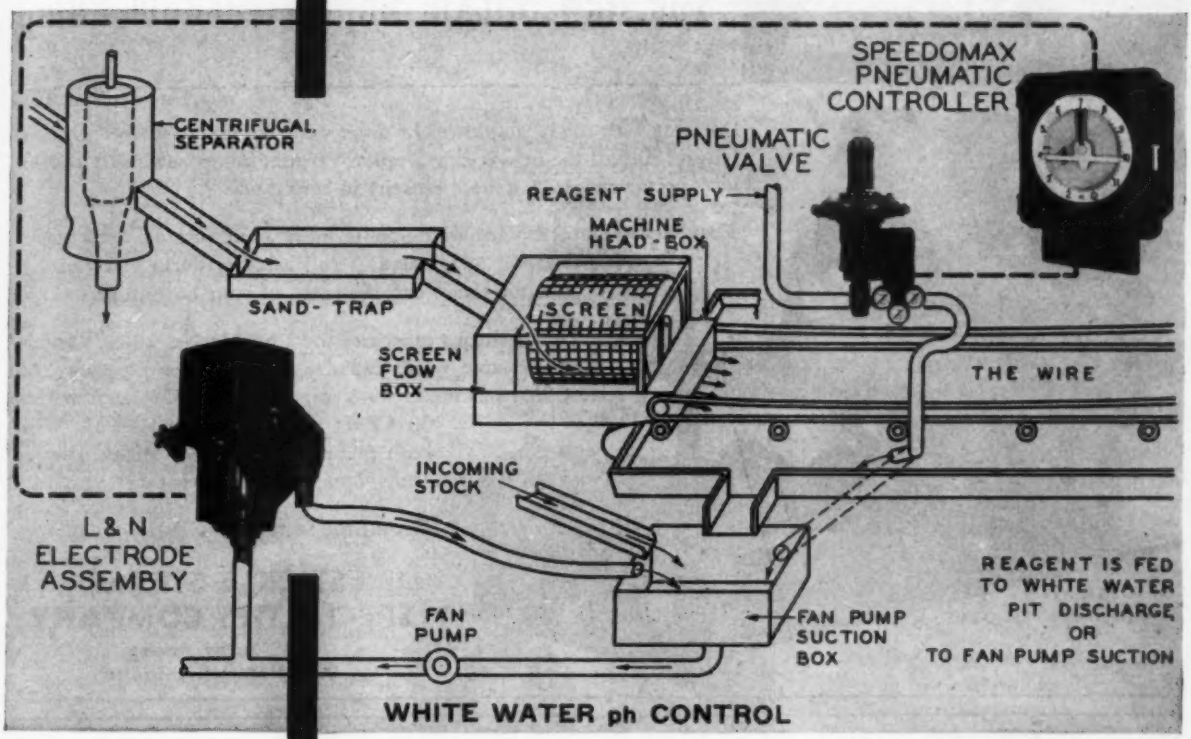

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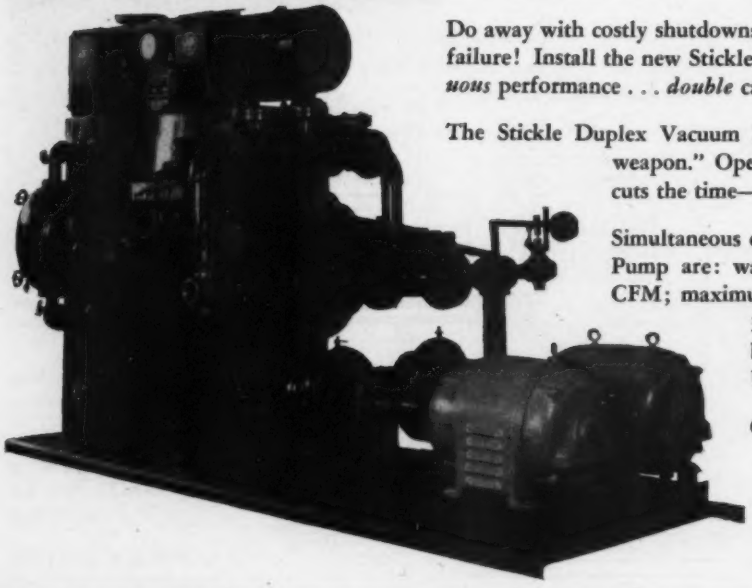

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The Paper Industry Names in the News

Munns Retires from Forest Service

Edward N. Munns, since 1937 chief of the Division of Forest Influences in the Forest Service, U.S. Department of Agriculture, retired recently after more than 39 years' service. He is an internationally recognized authority on watershed management and last year served on the President's Water Resources Policy Commission.

Mr. Munns came to Washington in 1923 as chief of the Forest Service experiment stations, in which cacapity he helped in the planning of the Midwest shelterbelts in the 1930s. Since entering the Service in 1912 Mr. Munns has initiated and directed many studies in silvics and watershed management. For nine years he was director of the Converse Experimental Station in California.

At one time he served as vice president of the International Union of Forest Research Organizations and on the land committee of the Interstate Commission on the Potomac River Basin. In 1947 he was a member of the Food and Agriculture Organization's rehabilitation mission to Poland, handling the forestry aspects of the mission. He is a native of St. Louis and a graduate of the University of Michigan.

R. B. Morden

R. B. Honeyman

R. Burke Morden, vice president and general manager of Morden Machines Co., Portland, Ore., has been elected president of the firm to succeed his father, C. W. Morden, who died recently. At the same time, *R. Blakeley Honeyman,* assistant general manager, was made vice president.

Frank P. Minnelli has been appointed manager of the newly organized market research department of Yale & Towne Mfg. Co., Philadelphia Div. Mr. Minnelli, who was formerly assistant to Elmo Roper, will work in the development of future sales to industry.

James E. Duffy, director of flexible packaging sales for Union Bag & Paper Corp., has been elected president of the National Flexible Packaging Association.

Norman J. Johnson has been appointed assistant general manager of Griffith Rubber Mills, Portland, Ore. Mr. Johnson, who has been with the firm 10 years, has served as assistant treasurer since 1947. In his new position he will supervise the development of specialty rubber products as well as the lines of finished rubber goods. He is a member of the National Rubber Industry Advisory Committee.

T. H. Davis

N. J. Johnson

AFPI Appointments

Theodore H. Davis, district forester for Champion Paper & Fibre Co., Canton, N.C., has been added to the staff of the American Forest Products Industries as a forester. His work will include the promotion of the American Tree Farm System and the Keep America Green fire prevention program.

Promoted to the position of chief AFPI forester was *James C. McClellan,* for five years a forester. The announcements were made recently in Washington, D.C., by Charles A. Gillett, managing director of the organization.

Prior to his association with Champion Mr. Davis was in charge of the field office of the Central States Forest Experiment Station at Urbana, Ill. At one time he was assistant state forester for the State of Indiana in charge of fire protection and administration of the forest tax law. He is a senior member of the Society of American Foresters and chairman of the Society's Appalachian Section.

Allis-Chalmers Elects New Officers

Allis-Chalmers Mfg. Co., Milwaukee, has announced the election of five new officers and the advancement of three others. *W. G. Scholl,* general sales manager of the tractor division, was named vice president in charge of sales for that division; *C. W. Schweers,* director of sales in the general machinery division, was named vice president in charge of sales for that division; *J. F. Roberts,* director of engineering in the general machinery division, was named vice president in charge of engineering for the division; *W. A. Yost,* manager of the mechanical power department, was named a vice president of the general machinery division; *G. F. Langenohl,* assistant treasurer, was elected to the post of treasurer and appointed assistant secretary; *N. D. Johnson,* assistant secretary, will continue to serve in that capacity and will assume additional responsibilities as assistant treasurer; *E. J. Dietrich,* assistant to the comptroller, and *T. D. Lyons,* works comptroller, were named assistant comptrollers.

Robert C. Evans has been appointed executive assistant to the manager of the Western Division of Atlas Mineral Products Co. of Mertztown, Pa. The division headquarters are at Houston, Texas.

David A. Goodkind was recently elected to the board of directors of Merritt-Chapmann & Scott Corp., heavy construction contractors. Mr. Goodkind is the senior member of David A. Goodkind & Co., certified public accountants and tax consultants.

George G. Goecke has been made sales engineer for Industrial Ovens, Inc., Cleveland. For the past year he has been manufacturer's representative for Warren Steam Pump Co. in northern Ohio and western Pennsylvania.

Carleton Ellis, Jr., was recently made director of sales for the Plaskon Division of Libbey-Owens-Ford Glass Co., Toledo, Ohio. He has been with the firm 18 years and has 20 years' experience in the synthetic resin field.

William J. McCudden has been appointed assistant to the president of Wallace Clark & Co., Inc., New York, N. Y., management consultants.

Hendley Blackmon has been named manager of engineering association activities for Westinghouse Electric Corp., Pittsburgh. He will be in charge of the

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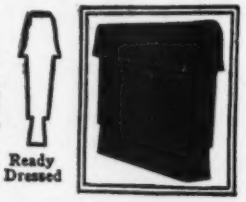

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preparation of papers to be presented before engineering association meetings. Mr. Blackmon, who joined Westinghouse in 1925, succeeds *Frank Thornton, Jr.*, who recently retired.

Clifford M. Dunn has been appointed manager of the Michigan Apparatus district of General Electric Co. He was made assistant manager in 1949. Mr. Dunn succeeds *Arthur R. Hines*, who has been named assistant manager of marketing.

Carl Elis Cederblom has been appointed senior consultant in the Space Planning Department of Ebasco Services, Inc. He was formerly project director for Rodgers Associates.

John T. McCarley has been promoted to assistant-general manager of the Philadelphia Division of Yale & Towne Mfg. Co. Succeeding him as manager of production is *Kenneth H. Bergstrom*. Mr. McCarley joined the firm in 1936 in its Automotive Division.

Nelson T. Hampson, treasurer of Lowe Paper Co., Ridgefield, N.J., has been elected vice president of the New York City Control of the Controllers Institute. Succeeding him as treasurer is *Stuart W. McLaughlin*, comptroller of West Virginia Pulp & Paper Co.

F. Ray Linda, formerly assistant technical director of St. Regis Paper Co., has joined the technical staff of Thilmany Pulp & Paper Co., Kaukauna, Wis., as a converting specialist. A graduate engineer, he is the co-author and did the development work on the original method of applying polyethylene to paper.

John B. Kohl has been appointed general sales manager of Northern Paper Mills, Green Bay, Wis., to succeed the late Herbert L. Nichols. Mr. Kohl has been associated with the firm since 1926.

Arthur B. Hall has been appointed director of industrial and public relations for Ohio Boxboard Co., Rittman, Ohio. He was formerly a vice president of Stahl-Meyer, Inc., New York, N.Y.

Hon. Clarence Wallaca has been elected a director of Powell River Co., Vancouver, B.C.

Stanley W. Brooks, has been named chief engineer for H. W. Butterworth & Sons., Co., Bethayers, Pa. For the past year Mr. Brooks has been in the engineering department at Bethayers.

Dennis E. Cousins has been elected a director of Hollingsworth & Whitney Co., Boston, Mass. A resident of Mobile, Ala., Mr. Cousins was mill manager of the firm's Chickasaw mill until 1940. He was elected vice president last year.

Walter M. Ralph, director of research and development for the past 22 years, has been made assistant to the president of National Aniline Div., Allied Chemical & Dye Corp., New York, N.Y. Mr. Ralph is to be succeeded by *Dr. Wesley Minnis*, who for 20 years has been assistant manager in charge of research and development at the Buffalo, N.Y., plant of National Aniline.

Milan F. Dudeff has been elected vice president of sales and engineering of Charles Beck Machine Corp., Philadelphia. For the past several years Mr. Dudeff has been manager of sales and engineering. In addition to his election as vice president, he was also named company treasurer. *Henry E. Scherer* was installed as secretary.

Harold R. Fosnot has been appointed eastern sales manager for Graver Water Conditioning Co., with headquarters in New York, N. Y. He has been with the firm since 1935 and prior to his appointment was Chicago district manager. Replacing Mr. Fosnot at the Chicago office will be *Herman M. Ross*, formerly Cleveland district manager. The latter post has been assigned to *Richard E. Lewis*, who was previously in charge of water treatment at the home office in New York, N. Y.

J. L. Ober, vice president of Scott Paper Co., has been named chairman of the nine-member committee responsible for operation of the University of Maine Pulp and Paper Foundation.

Edmund C. Schorr has been appointed manager of sales at General Electric Company's Specialty Transformer and Ballast Department, Fort Wayne, Ind. For the past year Mr. Schorr has been assistant manager of sales.

Michael J. Hawkins, traffic manager and assistant purchasing agent for Bird & Son, East Walpole, Mass., recently celebrated his 45th year with the firm. He was honored by fellow employes at a banquet at the Parker House, Boston.

Kenneth W. Hutchins was recently appointed manager of industrial engineering for Rockwell Mfg. Co., Pittsburgh. He was formerly division industrial engineer for the Camas Division of Crown-Zellerbach Corp., Camas, Wash.

W. J. Boucher, sales manager of Fort Howard Paper Co., Green Bay, Wis., has been named vice president for sales.

Taylor D. Ward, director of advertising and sales promotion for Kimberly-Clark Corp., Neenah, Wis., has resigned effective November 1. According to a company announcement, he plans to establish a paper wholesaling firm. Mr. Ward has been with the firm since 1942, when he was made a division sales manager.

Edward B. Beeks has joined the Chicago sales office of the folding carton division of American Coating Mills, a subsidiary of Owens-Illinois Glass Co.

Charles M. Howell, former general manager of Scott Paper Co., has been appointed a lecturer in paper technology in the department of chemical engineering at the University of Maine, Orono.

Fred W. Seybold, chief engineer for E. P. Lawson Co., New York, N. Y., has been appointed assistant vice president of the firm. Mr. Seybold joined Lawson in 1945 after 11 years as chief engineer for American Type Founders, Inc.

John E. Brock has been named director of research for Midwest Piping & Supply Co., Inc., St. Louis, Mo. He was formerly a consultant for Union Electric Co. on the flexibility of steam piping systems, and for Missouri Research Laboratories on the analysis of nonlinear systems.

J. E. Brock

Cecil Harvey

Cecil Harvey has recently joined the headquarters sales staff of the motor division of Elliott Co., Ridgway, Pa. Mr. Harvey formerly handled the engineering and sale of electrical contacts for Gibson Electric Co.

Louis J. Hoffmann, formerly business manager of the St. Louis *Star-Times*, has been made vice president of Central States Paper & Bag Co., St. Louis. He will be in charge of personnel, general safety, plant protection, employe welfare plans, and some phases of sales training.

Miles H. Hubbard has been appointed northern division sales manager for the building materials department of Bird & Son, Inc., East Walpole, Mass.

Warren B. Beckler was recently named vice president in charge of manufacturing for Brown Co., Berlin, N.H. Mr. Beckler became works manager of the La Tuque, Que., sulphate pulp mill in 1942. He joined the firm in 1919.

Dr. T. Edward Maki, New Orleans, formerly in charge of the Gulfport, Miss., branch of the U.S. Forest Service's Southern Forest Experiment Station, has

been named head of the research program and curriculum in forest management at the School of Forestry, North Carolina State College.

Wilbur McFeely was recently named director of industrial relations for Riegel Paper Co. and Riegel Textile Corp. He has been assistant director since 1945 and is succeeding *Gerret R. Schenck*, who is retiring.

Walter A. Koehler was recently appointed sales manager of Milwaukee Lace Paper Co. For the past 13 years he has been sales representative for the north central district. In his new capacity Mr. Koehler will direct sales for the firm's complete line of paper specialties.

Beaven W. Mills has been named sales manager for Gairvure cartons by the folding carton division of Robert Gair Co., Inc.

Robert A. Collins, assistant superintendent of the Brunswick, Ga., plant of Hercules Powder Co., has been transferred to the firm's operation at Hattiesburg, Miss., as assistant plant superintendent.

McDuff W. Lamb, formerly manager of the eastern Canadian sales offices of Bradshaw Ltd., has been appointed sales promotion representative for Transparent Paper Products Ltd., Montreal.

L. O. Blackburn has been appointed eastern division manager for Reichhold Chemicals (Canada) Ltd., Toronto.

Lee Trenholm, advertising and public relations manager of Provincial Paper Ltd., a subsidiary of Abitibi Power & Paper Co. Ltd., has been appointed advertising and public relations manager for the two firms.

Thomas L. Stirling, former western sales manager for Oxford Paper Co., has been made vice president in charge of the book paper department of La Salle Paper Co., Chicago.

Solvay Sales Division of Allied Chemical & Dye Corp. has announced three executive appointments. *Lester B. Gordon*, presently director of sales, has been made vice president. *Denman Peniston*, a veteran of 41 years with the firm and now assistant director of sales, becomes director of sales. *Col. John Elleman*, currently sales manager for the calcium chloride department, will be assistant director of sales.

Ralph A. Brabbee has been appointed advertising and sales promotion manager of Kimberly-Clark Corp., Neenah, Wis. He has been associated with the firm since 1940 and for the past several years has been in charge of the sales training program.

F. S. Washburn, a board member of American Cyanamid Co. and director of its Agricultural Chemicals Division, has been elected president of the firm's Canadian subsidiary, North American Cyanamid Ltd. He succeeds *H. P. Eastman*, who retired August 31. *E. D. Powers*, a vice president and director of the parent company, was elected vice president.

H. Gordon Smith, vice president and general manager of U.S. Rubber's textile division, has been named to the newly created post of executive vice president.

Elliott M. Little, president and general manager of Anglo-Canadian Pulp & Paper Mills Ltd., Quebec, Que., has been elected a director of Albert E. Reed & Co., Ltd., London, England. Reed & Co. are manufacturers and converters of pulp and paper products.

Roland A. Sharp has been named jobber division manager of the sales department of American Tissue Mills, Holyoke, Mass. At the same time *John T. Turner* was made specialties and export division manager.

Raymond J. Kautz, Chicago, has been appointed assistant manager of Olin Products Co. Inc., New York, N.Y. He joins Olin after four years as general sales manager of Simmons Slicing Knife Co.

William A. Hanway, secretary of International Paper Co., has accepted the chairmanship of the paper committee for the New York City Cerebral Palsy Society's 1951 Campaign.

A. R. Caputo has been promoted to the position of sales manager for American Box Co., Cleveland. He was formerly assistant sales manager.

John Elleman

Lester B. Gordon

Denman Peniston

A. R. Caputo

John F. Zieserl was recently appointed Chicago district manager for industrial chemical sales of West Virginia Pulp & Paper Co. He will direct sales in 16 Midwestern states.

James P. Casey

Paul Shildneck

A. E. Staley Mfg. Co., Decatur, Ill., has named three men to major positions in its research department. *Paul R. Shildneck*, research director since 1947, has been made assistant technical director. *James P. Casey*, associate professor in the pulp and paper department of the college of forestry at Syracuse University, was appointed director of the technical service branch of the firm's research organization. *Dr. Edward G. Samsa*, formerly with the Armour Research Foundation in Chicago, has been named research chemist in the oils and protein laboratory.

J. L. Mohun has been appointed division manager of industrial insulation sales at the Houston, Tex., office recently opened by Baldwin-Hill Co.

Stephen J. Geoghegan has been appointed vice president in charge of materials control for Industrial Tape Corp., New Brunswick, N. J. He has been associated with the firm's control division for several years.

Arthur J. Dobbs has been made sales promotion manager for Ever Ready Label Corp., Belleville, N. J.

Janet E. Gibbs has resigned as advertising and publicity director for Ever Ready Label Corp., New York, N. Y., and Belleville, N. J.

Norman Foley has been named manager of Marathon Corporation's Menominee (Mich.) Division. He has been associated with the firm for the past 37 years.

A. D. Engle, Chicago district engineer for Austin Co., has been appointed assistant vice president for research. He will be responsible for special engineering research and certain foreign assignments and will be located at the firm's headquarters in Cleveland.

William Guy Martin has retired as Pacific vice president of Harris-Seybold Co. after a quarter century association

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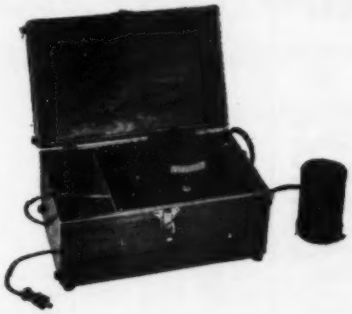

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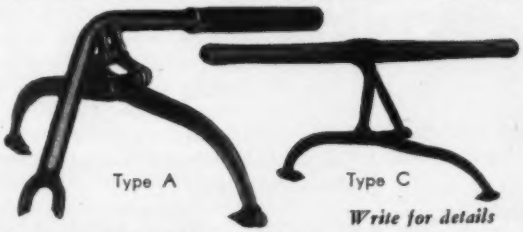

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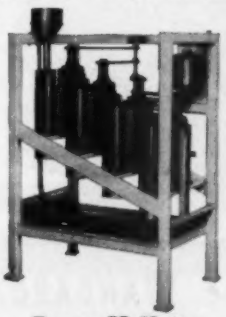

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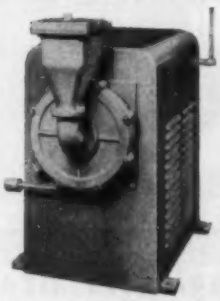
Standard apparatus for fractionating samples of pulp or fluid paper stock to classify fiber lengths, providing basic data for the regulation of beating or refining operations.



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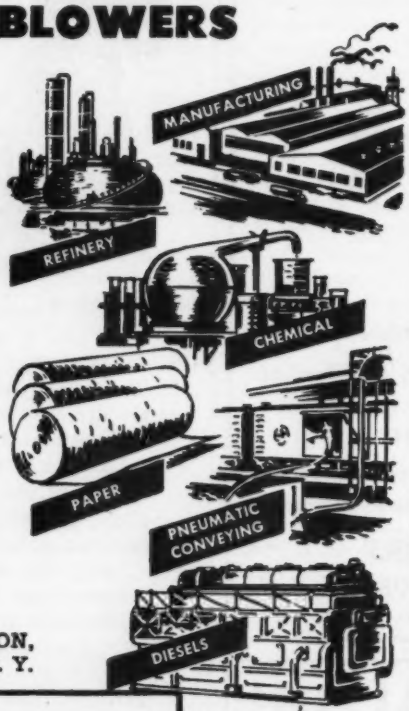

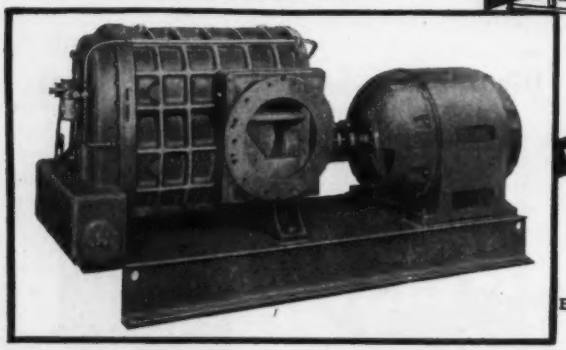

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with the firm. He was a pioneer in the development of offset lithography and had been connected with the graphic arts industry for more than 40 years.

Arthur L. Brown, for the past 17 years a member of the sales staff of Nekoosa-Edwards Paper Co., Port Edwards, Wis., has announced his retirement. He will become associated with Atwood Paper Co., Chicago, in a sales and executive capacity.

Richard G. Burton, formerly associated with Union Bag and Paper Corp., has been elected vice president of operations for Valley Containers, Inc., a subsidiary of Ottawa River Paper Co., Toledo, Ohio. He is also a vice president of the parent firm.

Paul L. Wright has been named sales manager of the Buffalo, N. Y., plant of Joseph T. Ryerson & Son, Inc., steel distributors. He was formerly office manager, in which capacity he also served as supervisor of the firm's inside sales department.

Glenn W. McPherson has been named assistant to the vice president and managing director for Alaska Pine & Cellulose, Ltd., Vancouver, B.C.

Clark Carnes, formerly in the industrial relations department of Kimberly-Clark Corp., has been appointed personnel manager of International Cellucotton Products Co., Chicago.

Two executive appointments were announced recently by A. O. Smith Corp., Milwaukee. *John B. Madden,* former product supervisor, was named hydraulic sales manager for the north central district, with offices in Chicago. *Alfred E. Treen,* previously associated with the firm's personnel administration staff, was made manager of personnel and purchasing at the Houston, Tex., plant. He succeeds *F. B. Dunn,* who recently resigned.

Neenah Paper Co., Neenah, Wis., has announced the election of *Leo O. Schubart* as vice president and secretary. *Donald H. Severson* was named treasurer, while *Dan A. Hardt* was elected to the board of directors. *John R. Kimberly* has been made chairman of the board to replace James C. Kimberly, who resigned recently.

Dominion Foils (Canada) Ltd., Montreal, recently announced two executive appointments. *J. C. Manson* was made Vancouver branch manager, while *R. G. Hughes* was named western sales manager.

Continental Can Co., New York, N.Y., has announced the election of *Lawrence Wilkinson* and *E. R. Van*

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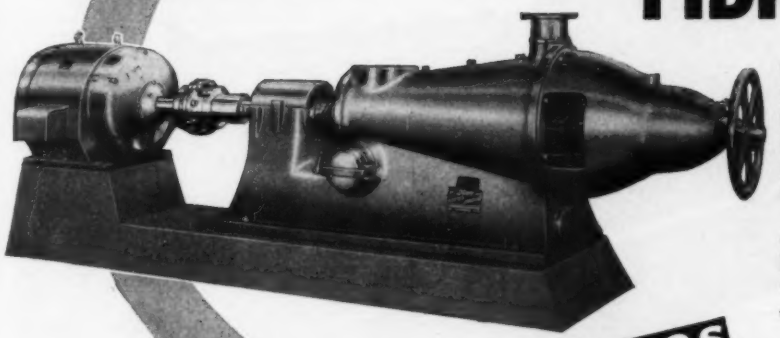

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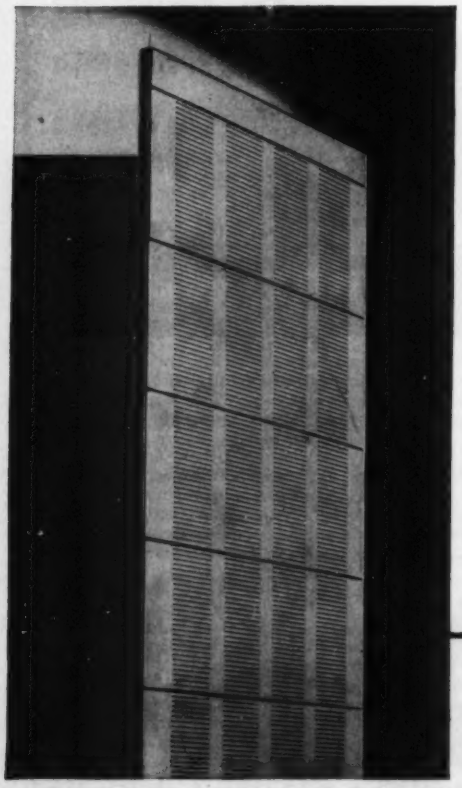

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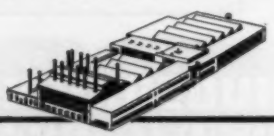

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Meter as vice presidents. Mr. Van Meter, who has been general manager of the paper container division since 1950, will now be in charge of that division. Mr. Wilkinson, formerly director of the New York Civil Defense Commission, will be assistant to the chairman of the board.

Wyandotte Chemicals Corp., Wyandotte, Mich., has recently announced three appointments to its research staff. *Paul W. Blume,* formerly with Michigan Chemical Corp., has joined the market development department. *James R. Taylor* was appointed to the staff of the firm's Los Angeles laboratory, where he will conduct research into the development of specialized cleaners for the aircraft and automotive equipment industries. Named to study the synthesis of organic compounds and surfactant development was *Dr. Donald E. Trucker,* a recent graduate of Polytechnic Institute of Brooklyn.

Hagan Corp., Pittsburgh, has named managers for its three newly opened sub offices in the Chicago district. *Art Soderberg* is in charge of the Rockford, Ill., office; *Wilf Chapman* the Peoria office, and *Otto Lessa* the Indianapolis office. The branches also serve Hall Laboratories, Inc., Calgon, Inc., and Buromin Co., all Hagan subsidiaries. The Chicago district office, opened early this year, is managed by *Harry E. Morton.*

Nekoosa-Edwards Paper Co., Port Edwards, Wis., has announced reassignments in sales personnel. *Gerard E. Veneman,* formerly of the New York office, and *L. A. Gardiner,* former West Coast representative, have been assigned to the Chicago office. *Marvin E. Love,* assistant advertising manager since 1947, will replace Mr. Veneman, while *Robert C. Farnsworth,* former consumer contact salesman, replaces Mr. Gardiner.

Reliance Electric & Engineering Co., Cleveland, recently appointed two of its top engineers to positions in its general sales organization. *Paul W. Arnold,* for several years manager of product sales, was named executive assistant to the sales vice president. *Richard A. Geuder* was assigned manager of the new department of applied engineering and industry sales. He headed the firm's application engineering work since 1944.

Hollingsworth & Whitney Co., Mobile, Ala., has announced the following staff promotions at its Chickasaw Mills: *Forrest B. Smith,* from superintendent of power and maintenance to general superintendent, utilities and maintenance; *Thea C. Bannister,* from assistant pulp mill superintendent to pulp mill superintendent; *Charles D. Ingram,* from chief chemist to technical superintendent; *Ogden W. Jervis,* from assistant power engineer to superintendent of power, and *William J. Allen,* from power plant foreman to assistant superintendent of power.

River Raisin Paper Co., Monroe, Mich., has announced two executive appointments. *Hobart V. Hodge,* general sales manager, was made vice president for sales. *A. W. Schulte,* manager of the firm's Cleveland plant since 1942, will succeed Mr. Hodge as general sales manager.

Black-Clawson Co., Hamilton, Ohio, recently announced the appointments of *Frank T. Peterson* as assistant to the general manager of the Hamilton Division, and of *George M. Pennock* as the division's chief development engineer. Mr. Peterson, who has been associated with the firm for the past five years, was previously managing director of Black-Clawson's British subsidiary, B-C International Ltd., London. Mr. Pennock has been director of export engineering for the company's export department located at the Shartle Division in Middletown.

The Paper Industry Necrology

Charles Larned Robinson, 84, died in Doctors' Hospital, New York, N.Y., August 17. He was founder of Robinson Tag & Label Co., New York, N.Y., and was founder and president of Soabar Co., Philadelphia. Mr. Robinson also headed two subsidiaries of Robinson Co., Dixie Tag Co. of Charlotte, N.C., and J. J. Stone Co., Greensboro, N.C. Two daughters and three grandchildren survive.

Samuel Kardon, founder and president of American Bag & Paper Corp., Philadelphia, died August 21. Surviving are the wife, a son, and three daughters.

Floyd Robert McDonald, vice president and general manager of Peacock Brothers Ltd., Montreal, died August 16. He was 52.

Glenn Sensiba, Kenilworth, Ill., general manager of Sigmund Ullman Co., Midwest division of Sun Chemical Corp., died August 18 following a long illness. He was also a director of Kable Printing Co., Mt. Morris, Ill. Surviving are two daughters, two sisters, and three brothers.

Joseph Giordano, president of the Giordano Waste Material Co., died in Philadelphia July 2.

Morley P. Eager, president of Hamilton Paper Box Co., Hamilton, Ont., died at his home August 26. He was 84. Mr. Eager founded the firm in 1897 and became its president in 1945. He took an active part in the direction of the company until about three years ago. Surviving are two sons, William M., vice president of the firm, and Jack H., secretary-treasurer.

John D. Watson, 71, vice president and general manager of Wisconsin Wire Works, Appleton, died August 23 after a long illness. At the time of his death he was a director of Pacific Coast Paper Mills, Bellingham, Wash. Mr. Watson, a native of Scotland, had been manager of the Appleton firm since 1904. Surviving are two daughters, three sons, a brother and a sister, and three grandchildren.

George Angus Davidson, widely known in the Canadian paper industry and formerly sales manager for Howard Smith Paper Mills Ltd., died September 1 at the age of 72. He was instrumental in developing and introducing many grades of fine paper that were formerly imported and at one time served as chairman of the book and writing paper section of the Canadian Pulp and Paper Association.

Louis B. Hanchett, 73, secretary of Hanchett Mfg. Co., Big Rapids, Mich., until his recent retirement, was killed August 28 in an automobile accident near Williamston, Mich. At the time of his retirement he had been associated with the firm for more than 50 years. Mr. Hanchett was co-inventor of the saw swage, which was the company's first product.

Irvin W. Rozene, 54, salesman for Se-Us Paper Co., died unexpectedly August 17. His home was in Champaign, Ill. Survivors include the wife, one sister, and two brothers.

William R. Ingersoll, 62, Philadelphia representative of Mead Sales Co., died August 30 at his home in Wynnewood, Pa. Surviving are the wife and a sister.

Willis H. Lamme, 79, former superintendent of the Advance Bag Co., Middletown, Ohio, died June 18 in a Cincinnati hospital. He is survived by a son, Roy, and a grandson, Roy, Jr., both of Jackson Heights, N. Y.; a granddaughter, Mrs. Joseph G. Thomas, and four great-grandchildren.

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A set of ten 35mm sound slidefilms—all that is needed for a course in safety fundamentals. The films explain how to organize a safety program, what part the foreman plays in the program and how safety increases production. They also discuss specific safety activities, such as machine guarding, safety inspections, the first aid program, etc. Complete with leader's manual in an attractive leatherette case.

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The Paper Industry Safety News

Ontario Firms Set New Safety Record

During 1950 member mills of the Ontario Pulp & Paper Makers' Safety Association established a new low in time-lost accidents. Although there was an increase in the number of fatal injuries, the total disabling injuries decreased by 4 per cent. This all-time low record for mills, 17.3 disabling injuries per million man hours of exposure, follows a record year in 1949, when a radical decrease in injuries occurred.

According to a report issued by the Association, the woodlands frequency rate increased from 68.3 per cent in 1949 to 70.4 per cent last year. However, fatal injuries in the woods were reduced from 12 to 9.

The mills reported seven fatal accidents, 790 other disabling injuries, and 2,985 non-disabling injuries. In woodlands operations there were nine fatal accidents, 1,915 other disabling injuries, and 1,331 non-disabling injuries.

Winners of the Association's accident prevention competition were as follows: Class "A" mills, E. B. Eddy Co., Ottawa mill; class "B" mills, Hinde & Dauche, Chatham Div.; class "C" plants, Kimberly-Clark Corp., Kapuskasing; woods operations, Fort Francis Logging Div., Ontario-Minnesota Pulp & Paper Co. Ltd.

Southern Mills Issue Six-Month Report

According to figures released in August by the Southern Pulp and Paper Safety Association, four southern paper mills had perfect safety records for the first six months of 1951. The overall rate for all member mills was 9.31 as compared with 11.03 for the entire year of 1950.

Companies with perfect records were Brunswick Pulp & Paper Co., Brunswick, Ga., with 584,723 man-hours exposure; Armstrong Cork Co., Macon, Ga., 516,880 man-hours exposure; Mead Corp., Harriman, Tenn., 222,636 man-hours exposure, and Mead Corp., Nashville, 117,886 man-hours exposure.

Two bag plants were also listed as having achieved perfect records: Gulf States Paper Corp., Tuscaloosa, Ala., 679,362 man-hours exposure, and Hudson Pulp & Paper Corp., Palatka, Fla., 271,076 man-hours exposure. In woods operation St. Regis Paper Co., Pensacola, Fla., and Mead Corp., Lynchburg, Va., reported no lost-time accidents during the first six months.

Mechanized Equipment in Accident Prevention

Of all disabling accidents in materials handling, 85 per cent are caused by lifting. This was revealed recently, when R. C. Sollenberger, executive vice president of the Conveyor Equipment Manufacturers Association, addressed a meeting of the American Materials Handling Society in Pittsburgh. He emphasized the fact that mechanized handling equipment can cut accident rates and improve health conditions in industry. Materials handling equipment has probably contributed more to safety than any other single class of equipment. It has been shown that lack of mechanization to help employees perform their jobs is a major cause of fatigue, a liability in the current period of labor shortages.

Pulp and Paper Safety Discussed at Wisc. Meeting

More than 125 industry representatives attended the September 19 sessions of the Pulp and Paper Section of the Fox River Valley and Lake Shore Safety Conference, which was held at the high school in Menasha, Wis. The meeting had been postponed from May 17, when the Conference held its 23rd annual gathering in Manitowoc.

Featured during the sessions were an address by F. S. Seaborne, chief mill manager for Kimberly-Clark Corp., on "Determination for Prevention of Injuries in the Pulp and Paper Industry;" an address by Harold R. Alley, industry representative for the National Safety Council, on "Teamwork for Pulp & Paper Safety," and a talk by Richard Ketchell, Marathon Corp., on "Materials Handling." Also appearing on the program were Clifford P. McBride, president of the Wisconsin Council of Safety; Ralph T. Olson, adjutant general of Wisconsin; John C. Arnold, president of the Neenah-Menasha Trades and Labor Council; Richard W. Mahoney, president of Appleton Coated Paper Co., and Voyta Wrabetz, chairman of the Wisconsin Industrial Commission.

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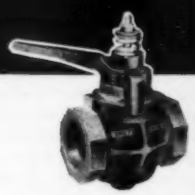

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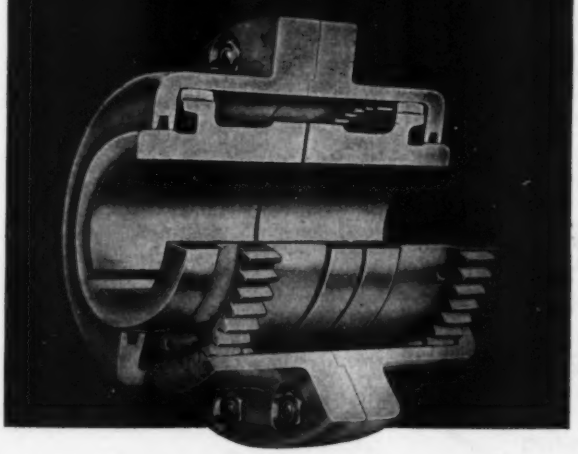

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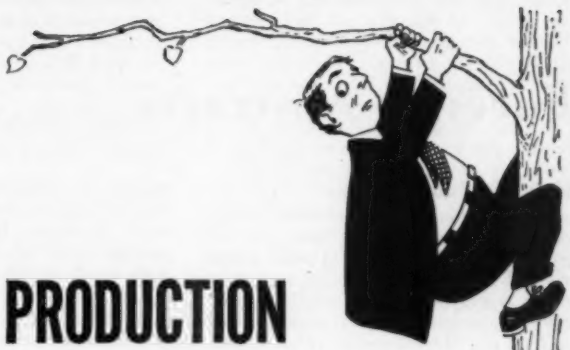

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Foreign Abstracts.....

Hot Air Pulp Drying

Two stages in the use of transmission and radiant heat in the drying of pulp are considered: (a) the movement of water within the web, and (b) evaporation of water from the surface of the web. The first stage becomes important when the pulp surface reaches the fiber-saturation point. From that point on, the drying process becomes slower and surface temperatures may aggravate damage to the quality of the pulp. This should be considered in constructing fan dryers (the sectional construction of which is discussed). No important development has taken place with regard to vapor economizers. However, the recovery of heat (in water) has come into more general use. The article is illustrated with schematic drawings, and the paper is one that was given before the sulphite section of the Finnish Paper Engineers Association in April, 1951. Heikki Pero. *Paper and Timber* (Finland), *33*, 232-35 (original in Finnish with English summary).

White water and flotation savealls

The principles of flotation and flotation type savealls (like those of Sveen Pedersen, Adka, Savalla) are described briefly, and reference is also made to the Arledter saveall, which represents a combination of flotation and sedimentation. These descriptions are illustrated with schematic figures. The author then discusses those factors which influence the consistency of white water (especially the raw materials, beating and sizing) and (to a lesser extent) basis weight, weave and speed of wire, and the suction applied at the suction boxes. Such fibrous materials as spruce groundwood and soda pulps are separated more easily by flotation than by sedimentation. Sulphite pulps appear to respond equally well to either treatment.

Flotation savealls are not very sensitive to changes in consistency or (within reasonable limits) to the amount of white water. On the other hand, sedimentation savealls vary in efficiency with changes in consistency and have a lowered efficiency with increased amounts of white water. The white water problems are not only dependent on a satisfactory saveall operation, but are concerned with the rapid and continuous return of the recovered stock to the cycle.

With mills having a high output and producing only one type of paper the problem is less acute than with mills in which paper quality, basis weights and colors are frequently changed. The author outlines the advantages of returning rich white water from the savealls to the mixing box of the paper machine (*not* to the beaters) provided the fibrous material is well flocculated.

Flotation savealls have a greater thickening capacity than do those of the sedimentation type and the efficiency of a saveall increases with its thickening capacity. The quantity of recirculated water increases in the same ratio as the amount of rich white water decreases. It appears to be quite material as to whether a saveall operates with a high or low thickening capacity. In the former case, the construction can be smaller and fewer chemicals are required. The author points to marked power savings through efficient white water utilization. Ferdinand Kück. *Papier fabr.* 79, 3-6, 33-36 (Jan. 15 and 31, 1951 (In German).

Drying of cellulosic matter followed by continuous weighing

Using the Chenard thermobalance made by the Imphy Steel Works, at Nievre, which permits a continuous photographic record of losses in sample weight with gradually increasing temperatures, the authors studied the rate of evaporation of water of the following substances:—gypsum *(I)*, raw cotton *(II)*, cotton purified by a mild chemical treatment, cotton beaten to various degrees Schopper Riegler *(III)*, bleached unbeaten sulphite pulp *(IV)*, and beaten sulphite pulp *(V)*.

Complete dehydration of *I* (with loss of 20.85 per cent water) was attained only at 250 deg. C. *II and IV* retained slightly over 0.1 per cent water at 105 deg. C. When beaten in a Jokro mill, both cotton and pulp showed a marked increase in water retention. Thus *III* beaten to 46 deg. S-R. retained 0.2 per cent water at 105 deg., and at 79 deg. S-R. *III* retained 0.4 per cent. *V* retained 0.9 per cent water at 65 deg. S-R., and about 2 per cent at 87 deg. S-R.

Graphs are given which show water loss with rising temperatures, and the slopes of these curves are similar. In the case of *II*, and chemically purified cotton, temperatures were raised as high as 260 deg. C. No marked loss in weight of *II* was noted between 120 and 183 deg., after which however, volatile matter was given off, at a rapidly accelerated rates when 220-30 deg. was reached. A sketch of the thermobalance, and photomicrographs of the beaten pulps are included. The results are fully discussed and are compared especially with those reported by P.H. Hermans (Cf *Contribution to the Physics of Cellulose Fibers, Chapt. 3, (1946)*). The authors give 10 figures and 7 references. M. Chene and G. Rochet, Bull. Assoc. Tech. Ind. Papetiere, 5, No. 2, 61-68 (1951) (In French).

Symposium on beating

Experiments with a mill-scale high speed refiner and a jordan are described; these were carried out in connection with the installation of a continuous mill beating operation. In the large scale trial it was difficult to keep all variables under control, but a large number of tests were repeated to insure the observation of true differences. The findings were deduced from an analysis of many hundred curves relating to different qualities and variables.

Testing procedures on the samples included wetness, sheet-drainage time, fiber index, shrinkage on drying, density, air porosity, oil-penetration time, bursting strength, breaking length, and elongation. Variables in the refiner operation included: throughput of pulp, power consumption, pulp consistency, hydraulic pressure within the refiner, and setting of the recirculation valve. Those in the jordan included shell setting or power input; consistency, and hydraulic pressure. Most of the findings were negative. The changing of the different experimental variables altered neither the economic nor quality aspects of beating operation, at least not beyond that of normal error spread of the experimental runs. This was especially true in the case of the highspeed refiner.

The jordan operation was also relatively little affected by altering the operating variables, although here low power consumption and high operating pressure may somewhat increase its tendency to wet beating. The most significant find was that by any normal alteration of external operating variables of the refiner or the jordan it was impossible to render them capable of producing the same quality of pulp. It made little final difference in the pulp quality as to whether the pulp was wet beaten before being cut, or vice versa. C. R. G. Maynard. *Worlds Paper Trade Rev., 135*, No. 17, 1225-30, 1235-40 (1951); *Paper-Maker* (London), *121*, 17-20, 22, 24, 26, 30, 32, 34, 58 (midsummer number) (1951).

Technical papers presented by German pulp and paper chemists and engineers

At the meeting held at Detmold, Germany (June 5-8, 1951), the following men presented papers, brief abstracts of which are given herewith.

Dr. von Lassberg (of Augsburg) spoke on the possible uses of the *Diesel motor in the paper industry*, stressing some of the future economics in its use. Recently Diesel motors have been used in the grinder room.

Von Wagner (of Winterthur) spoke on the *use of turboblowers in paper machines*. These were first introduced in Switzerland in 1943 and permitted such a marked saving in cost of operation (in the drying of paper) that over 100 such pieces of equipment have been delivered to German mills.

Hermann (of Aschlaffenburg) reported on the *rationalization of internal transport operations in the pulp and paper industry*, stressing especially the economies effected by the American Clark-Hubstapler equipment. This was illustrated by means of movies. In a discussion which followed, Dr. Lesser pointed out that the operator in the U.S. was protected by means of a roof, whereas in Germany the worker remained unprotected.

Director Ahlström (a visitor from Stockholm) lectured on his experiences *in concentrating and burning sulphite waste liquors*. The system used evidently requires only infrequent cleaning. The heat exchanger in the equipment is provided with geometrically similar tubes, so arranged that the path of flow can be reversed. Thus, incrustating substances ordinarily deposited

by the liquor can be redissolved by the incoming hot condensate. Cleaning (when required) was usually carried out with nitric acid. About 50 per cent of the steam requirements of a sulphite pulp mill can be obtained by burning the liquor; in Hallstank, evidently the liquor furnished heat ordinarily obtainable with coal (but other mill experiences were less felicitous). Dr. Kraft (of the Marathon Corp.) spoke on *pulp bleaching in America,* stressing continuous bleaching; 3-4 stage sulphite, 5-6 stage kraft bleaching operations, and peroxide bleaching of groundwood. Sodium chloride bleaching, its costliness and advantages, was also mentioned.

Professor Staudinger (of Freiburg), after giving messages of good will from his university and of the Bunsen Society, launched into a discussion of the *micellar and molecular structure of cellulose.* Professor G. Jayme (of Darmstadt) unfortunately was ill, but his paper, on a new water soluble cellulose complex was presented by his colleague, Dr. Rothamel. This is evidently a *cobaltous compound of cellulose* (the formation of which is not described in the abstract).

Professor Wultsch (of Graz) spoke on the *wet barking method as applied to Alpine woods* (which had not been river driven). The power consumption and outputs of the stream, Schongau, Thorne, and Kamyr barkers were compared.

Professor Brecht (of Darmstadt) reported on the *most advantageous uses of the kollergang, refiner and curlator in the mill.* The functions of each were outlined. Dr. R. Runkel (Reinbek) spoke on *halfstuffs.*

Dr. Lange (of Stockholm) explained the equipment and techniques which he used in determining the *distribution of carbohydrates in pulp fibers.* Dr. Kesting (of Munich) spoke on the *properties and production of chlorine dioxide. The physical significance of the degree of beating and its relationship to paper strength* were discussed by Dr. Corte (of Mannheim). Finally Mr. Claas spoke of and showed lantern slides of *old paper mills* (many of which had been destroyed in the war). Abstracts reported by Dr. Munds. *Wochenbl. Papierfabr.,* 79, 383-386 (1951) (In German).

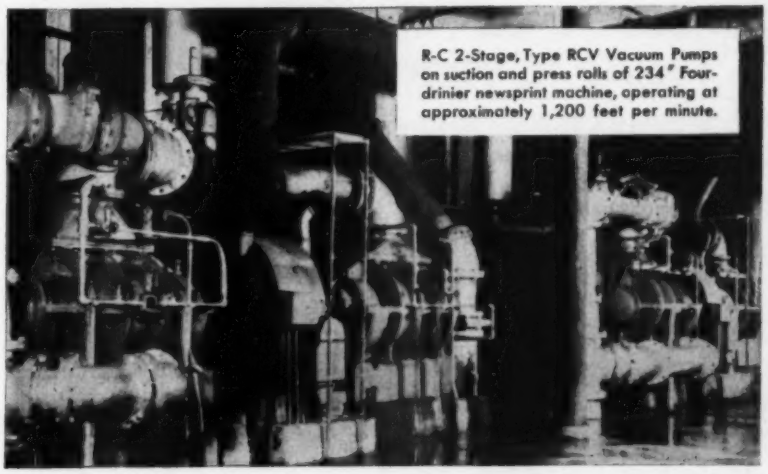
Influence of electrolytes on pulp and paper properties

This continues a study begun previously (cf. Cohen, *et al., Australian Pulp & Paper Ind. Tech. Assoc.* 3, 72 (1949)). The following anions in all cases (except in one instance) derived from sodium compounds were studied: chloride, bicarbonate, nitrate, acetate, citrate hydroxide, sulphate, phosphate, hexametaphosphate, citrate, and ferrocyanide. An unbleached, water-washed eucalyptus kraft pulp was used, and beating was effected in a Lampén mill (4,500 revolutions). Strength properties, air resistance, and freeness were usually sensitive to the presence of electrolytes in the water.

With exception of sodium hydroxide (where the effect of pH is marked) and of sodium hexametaphosphate, which gave rise to unusual effects, all other electrolytes influenced sheet properties in a way that could be attributed to the action of the univalent cation. The optimum concentration was 0.008 *N;* no relationship between the valence of the anion and pulp properties was discovered. At its optimum concentration (0.001 to 0.002 *N*) sodium hexametaphosphate caused some remarkable changes in handsheet properties greater than those effected by other electrolytes at any concentration. However, with increasing concentration, its influence decreased until at 0.016 *N* it was similar to that of the other compounds.

This effect of sodium hexametaphosphate was interpreted in terms of its known effects on colloid systems: its dispersive action, and its effect on bivalent cations. Thus sodium hexametaphosphate leads to better (more homogeneous) sheet formation, to greater strength properties and air resistance. Furthermore this electrolyte permits cation exchange on the carboxyl groups of the pulp (with sodium ion replacing the calcium or magnesium usually retained by water washed pulp). Thus the pulp is more hydrophyllic and beats more readily. Handsheet properties of most water washed pulps are insensitive to bivalent cations because their carboxyl groups retain calcium and magnesium.

Contrary to earlier statements, the effect of carboxyl groups in relation to the effects of electrolytes is considered highly important; it is simply masked in water washed pulps. Three tables, 3 figures and 8 references are given. W. E. Cohen, G. Farrant and A. J. Watson, *Australian Pulp & Paper Ind. Tech. Assoc. Proc.* 4, 176-94 (with discussion 195-197). (1950).



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Weight gage

The beta-ray gage is a device which automatically and continuously records variations in the weight of material, such as paperboard, plastics, rubber, metals, and special sheet materials. It is mounted on the machine and records the varying amounts of beta-rays absorbed by the material as it passes through the gage head of the noncontacting device. Operators are able to make adjustments of the machinery as needed from the recordings on a strip recorder placed alongside the gage control and indicator. The gage is unaffected by the speed, consistency, or temperature of the material being measured. *General Electric Co., Schenectady 5, N.Y.*

Stacker and hand truck

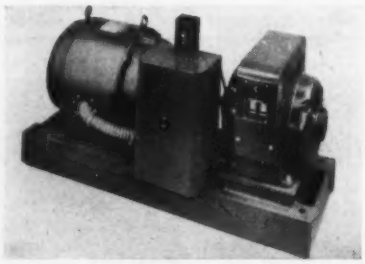
A combination fork lift-stacker and hand truck with elevating platform operating from a standard 6 volt automobile battery is capable of moving, lifting, and stacking loads up to 750 lb. and to a loading height of 55 in. in 6 sec. This unit has a battery activated motor mechanism which operates the hydraulic lift and a built-in charger for off-hour replacement. Highly maneuverable. *Clark-Hopkins Equip. Corp., 1124 Spring Garden St., Philadelphia 23, Pa.*

Fiber Strapping

A tough new ¾-in. strapping, "Fiberstrap," replaces steel strapping on packages requiring a pull of 275 lb. or less. It is particularly applicable to those covered by NPA Order M-59, restricting the use of steel strapping on packages weighing less than 90 lb.

"Fiberstrap" is said to have uniform tension when applied and sealed with a standard Steelbinder strapping tool. An adhesive surface is unnecessary. Test applications have included freight and express parcels of all sizes and shapes, and recoopering work on truck and rail shipments.

Available in 25-lb. coils, 1750 ft. long, at a price comparable to that of lightweight steel strapping. *A. J. Gerrard & Co., 1950 N. Hawthorne Ave., Melrose Park, Ill.*



Motor generator set

Plants using high-cycle automatic electric hand tools such as grinders and buffers will be interested in a compact, easily installed unit called the mono-coil high frequency motor generator set. It is used to convert 60 cycle current to 180 cycle and 360 cycle frequencies. Many ratings and speeds are available. *Electric Machinery Mfg. Co., Minneapolis 13, Minn.*

Running-time recorder

This instrument records on a chart the running time in hours, minutes, and seconds of production machinery and other similar equipment. Both operating and "time-off" periods are shown, making it easy to determine total operating time of a machine. Furnished in models suitable for wall, flush-panel or portable use. *The Bristol Co., Waterbury 20, Conn.*

Electrical tape

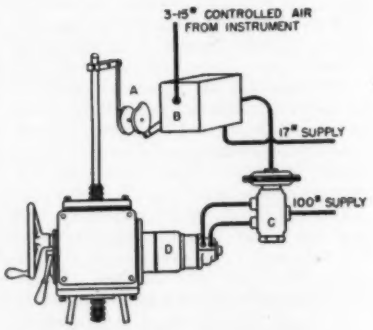
An extra thin electrical tape, made with Koroseal material, claims to have advantages over ordinary electrical tapes. The adhesive is non-transferring, allowing application many times on a dry surface without losing its stickiness, and it has a dielectric strength of 8000 volts. It is waterproof, highly abrasion resistant and flameproof, resistant to acids, oil alkalies and corrosive salts. Packaged in a roll 60 ft. long, with ¾ in. width and 0.007 in. thickness. *B. F. Goodrich, Akron, Ohio.*

High head pumps

Redesigned line of two-stage pumps has been improved with regard to compactness, pumping efficiency and mechanical ruggedness. Type DMD pumps are made in sizes from 2 to 10 in. discharge, and in capacities up to 4000 gpm and heads to 750 ft. *Economy Pumps, Inc., Hamilton, Ohio.*

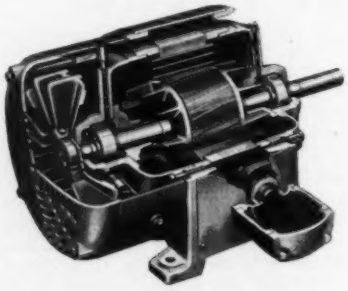
Air-fuel controller

Operating an electric or a pneumatic control valve, the L&N controller adjusts air flow to fuel flow changes rapidly without cycling. This fast response is obtained with full stability through the use of an improved control circuit. Wide range of proportional band and reset control actions make it easy to adjust the control to oil or gas firing, or to dual-fuel furnaces. Available in single instrument case and ratio range from 50 percent deficiency to 100 percent excess air. Direct remote control of air flow, and transfer from manual to automatic control are provided on the front of the instrument. *Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa.*



Valve positioner

Rotomotor is a pneumatic gear driven operator which insures accurate, sensitive, and positive positioning of large slide valves commonly used for handling back pressure control of flue gases, etc. Repositioning is accomplished by means of a tape type positioning to within 1/500th part of the total valve stroke. Available in a number of models for various travels, speeds, stem diameters and thrust loads, and shipped as complete units ready for installation. *Conoflow Corp., 2100 Arch St., Philadelphia 3, Pa.*



Explosion-proof motor

A totally-enclosed motor in different models has been developed that gives protection against highly inflammable gases, volatile liquids, and combustible dusts. Other types for non-explosion-proof services are also available. Features include sealed terminal, elongated spark-arresting bearing sleeves, streamlined housing, and other develop-

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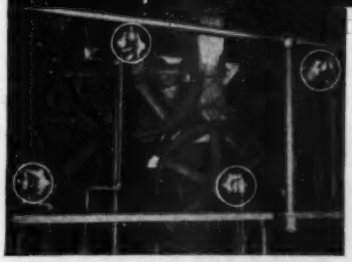

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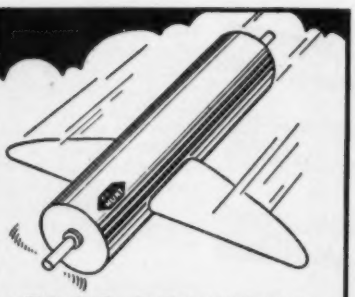

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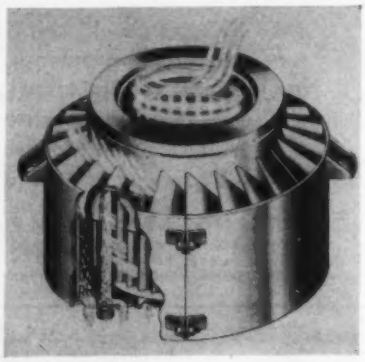
Chain Drive

The Hy-Vo power transmission chain drive features a new chain-and-sprocket engagement principle for speed applications higher than conventional chain drives and replacing unwieldy belt drives now required for high-speed power transmission. This design eliminates "chordal" action, reduces shock loading, highly aggravated stresses in chain links as well as noise, vibration and heating.

It makes possible a single drive unit capable of transmitting speeds up to 6,500 ft. per min. or rotative speeds up to 3,600 revolutions per min. and can increase efficiency and reduce power transmission costs in any field where single motors or engines are used in sizes of approximately 100 hp. and up. Produced for 1 in., 1½ in. and 2 in. pitches. *Morse Chain Co., 7601 Central Ave., Detroit 8, Mich.*



Steam Purifier

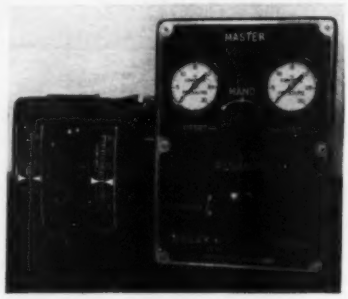
An internal type of purifier is announced, the Hi-eF purifier, which is guaranteed to deliver vapor with 1.0 ppm. or less of total solids. It has a wide range of applications inside steam drums, flash tanks, evaporators, packed towers, bubble-cap towers, deodorizers and stills. The unit contains no moving parts and eliminates the need for baffling in boilers and drums essential with conventional separators. Manufacturer claims that clean steam means greater production and longer life for reciprocating engines and turbines. Available in complete range of sizes in fabricated steel, stainless steels and other alloy materials. *V. D. Anderson Co., 1935 West 96th Street, Cleveland 2, Ohio.*

Floor Paint

Eliminating danger from slipping even under wet conditions is one of the advantages of this rubber-base coating for application to metal, wood or concrete. It is recommended for application to stair treads, ramps, garage aprons, platforms, marine decks and floor surfaces in general. *Wilbur & Williams Co., Brighton 35, Mass.*

Battery Charger

The Yale industrial battery charger, operating on the selenium rectifier principle, is designed to prolong battery life, save power, and simplify maintenance operations for units up to 55 ampere-hour capacity. Charging is done by an automatic controller governing the amount and time of charge. With its dual clock control, the charger affords identical protection to both new and old batteries, whether fully or partially charged either in a cold or warm area. It can be plugged into any standard 110/115 volt 60 cycle outlet. *The Yale & Towne Mfg. Co., Philadelphia Division, 11000 Roosevelt Boulevard, Philadelphia 15, Pa.*



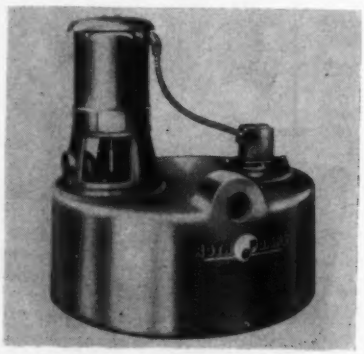
Miniature Instruments

Space savings is the highlight of the Mini-Line miniature indicators and control units. A Multi-Point Indicator uses 87 per cent less space than standard size, selector valve 52 per cent, and a remote manual relay 70 per cent. These instruments make it practical to concentrate into a small space before a single operator the controls for operating process units.

By using console type centralized control panels, control can be automatic, or if the operator wishes, individual units or the entire system may be controlled manually from relays at his finger tips. *Bailey Meter Co., 1050 Ivanhoe Road, Cleveland 10, Ohio.*

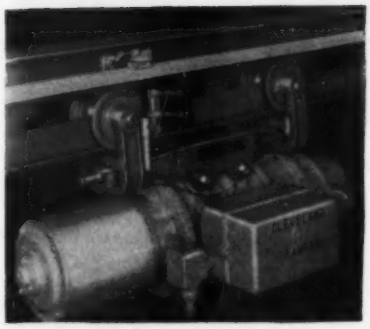
Masonry Cutting Blade

The Clipper "B-R" abrasive blade is break-resistant. Its most effective performance is in the softer range of materials such as limestone, sandstone, light aggregate concrete products and dry press refractories, transite, etc. For harder materials, Clipper metal bonded diamond blades are used. *Clipper Manufacturing Co., 2800 Warwick, Kansas City 8, Mo.*



Condensate Return Unit

This compact vertical condensate return unit has applications up to 8000 sq. ft. EDR at 20 psi. It handles water to 210 F. without vapor lock and the vertical design is especially adaptable for installations where the return piping is close to the floor level. Unit includes pump, cast iron or steel receiver, enclosed float switch, single phase or three-phase motor. *Roy E. Roth Co., 2420 Fourth Ave., Rock Island, Ill.*



Safety Trolley for Cranes

Here is a type of electrification arrangement, called the Saf-Powr-Bar, for overhead handling equipment that features safety and longer service. This two-way improvement consists of inverted U-shaped conductor bars inside of which operate sliding current collector shoes, which make positive contact with both top and two sides of conductor bar. Accidental contact with the bars is prevented by an insulating plastic covering. It has a longer service life than the open bar with collector wheels. *Cleveland Tramrail Div., Cleveland Crane & Engineering Co., Wickliffe, Ohio.*

Air Operated Starting Motor

Here is an air starting motor for cranking gasoline and diesel engines with piston displacements up to more than 3500 cu. in. It can be used in the lumbering, petroleum, mining, marine, heavy construction and power fields. Advantages, when compared to the electric starters, are the following: Smaller and more compact, no need for generators or banks of storage batteries, thus eliminating costs of battery maintenance and replacement; unaffected by climatic conditions.

Normally operated by compressed air, but also suitable for operation on natural gas where available at sufficient pressure. Available in two sizes: 9BM, which develops up to 16 hp, and 20 BM, which develops up to 41 hp. Easily installed, operated, and serviced. *Ingersoll-Rand Co., Phillipsburg, N. J.*

Box Sealer

Boxeal shipping case glue produces a sealed container that resists all-round stresses and strains. This improved dextrinized starch adhesive makes it possible to seal boxes by machine and hand brushing in 20 to 45 seconds. Operates on all varieties of container boards, all shapes of boxes, top flaps, bottom flaps, slide or telescope sleeves. Non-injurious to hands, face or clothes of workers. *Paisley Products, Inc., 1770 Canalport Ave., Chicago 16, Ill.*

Tester

Recent improvements of the Dillon multi-low-range tester, one of the most accurate of all load measuring devices, include the addition of a 300 lb. scale, improved motor drive, solid shaft connecting the speed control to motor transmission, continuous casting quadrant arm, and placement of the speed control dial on top of tester base for greater reading ease. Such items as cloth, paper, springs, adhesives, wire, leather, felt, plastics, fibers and virtually any material within its 300 lb. range can be tested on it. *W. C. Dillon & Co., Inc., 1421 South Circle Ave., Forest Park, Ill.*

Low-Pressure Coupling

The low-pressure wedge-lock coupling is designed for connecting lightweight pipe in ventilating and similar low-pressure service. Features speed and simplicity of installation. Built in one piece with gasket already in place, this coupling requires only a hammer to connect or disconnect it. Naylor pipe with banded or special grooved ends is furnished for use with the coupling. *Naylor Pipe Co., 1230 East 92 St., Chicago 19, Ill.*

Fire extinguisher

The Redi-Grip pressurized portable fire extinguisher is designed for one-hand operation in a wide range of industrial and institutional fire hazards. Approved by Underwriters Laboratories, Inc., it has a range exceeding 30 ft. and the discharge time of

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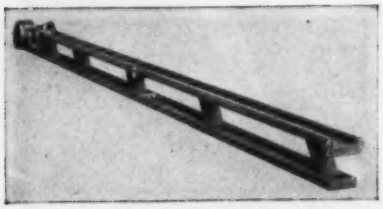
the 1 qt. size is about 27 sec. at 70 F. For close fire fighting this unit provides over 160 deg. of effective extinguishing action from one standing position. Available in 1, 2½ and 4 qt. sizes with a combination of charges. *Stop-Fire, Inc., 125 Ashland Place, Brooklyn 1, N.Y.*



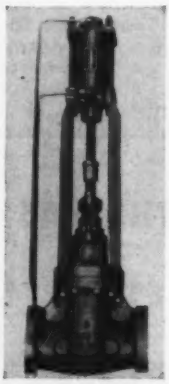
Oscillating Conveyor

A conveyor of oscillating trough type is now available for handling of a great variety of loose bulk materials at moderate capacities. Motion is imparted to this trough by a roller-bearing, constant-stroke eccentric. It comes in different dimensions, capacities and horsepower. *Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill.*

Tachometer

An indicator range knob on a new single head, fixed installation tachometer provides for three speed ranges. Any speed over a total range of 40 or 50 to 1 can be selected, based on reading down to 1/10 full scale of the lowest range. The ranges are carefully chosen for ease in reading, and the scales are all a full four in. long with 100 divisions. Scales are supplied for direct reading in any units such as rpm, fpm, inches/sec., or in any quantity which is proportional to the speed actuating the head. Various tachometer heads permit direct measurement ranges from speeds between ½ rpm and 100,000 rpm without requiring a speed changing drive of any kind.

The indicating meter is of rugged design and is mounted in sponge rubber. With ordinary open wires, the indicator can be located up to 1000 ft. from the head without materially affecting calibration. *Metron Instrument Co., 432 Lincoln St., Denver 9, Colo.*



Above: Tachometer

Left: Valve Actuators

Valve Actuators

Ledeen valve actuators are basically Ledeen cylinders equipped with brackets, valves, controls and couplings to make them suitable for almost any type of operation. They can be adapted to any make, size and type of valve; to operate against any line pressure; to work on any fluid medium, and with any pressure available. They can be arranged for on-and-off service, or for positioning service.

As a standard product, they are designed for the operation of gate valves, plug valves, dampers, diaphragm valves, butterfly valves and sluice gates. Valves are available for actuating air, oil, water or steam operated cylinders. *Ledeen Mfg. Co., 1602 S. San Pedro St., Los Angeles 15, Calif.*

Butterfly valve

R-S valve No. 788 is designed to seal water pressure by using a babbitted seat in the body and Monel or stainless steel welded to the periphery of the valve disc. Metal-to-metal seat like this gives satisfactory shut-offs in most installations. Remote, automatic or semi-automatic controls available. *R-S Products Corp., 4600 Germantown Ave., Philadelphia 44, Penna.*

Pantograph machine

This machine is designed for accurate milling, routing and engraving cylinders and rolls used to press, stamp, print, emboss, deboss and die cut various materials. Adjustments of various machine components may be made easily to meet a wide range of requirements as to ratio of reduction, range and roll diameter.

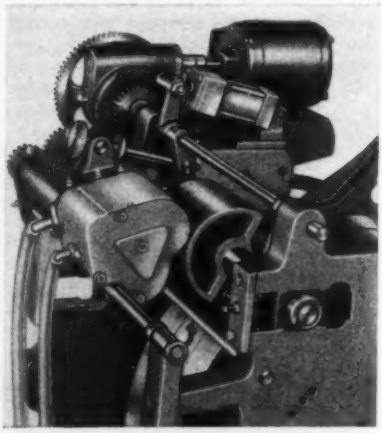
In operation it accommodates rolls (ferrous or non-ferrous metal and plastic) from 6 in. to 12 inches in diameter and up to 40 in. long. Net weight of entire machine is approximately 10,650 pounds and floor area is 80 in. wide by 87 in. front to back. *George Gorton Machine Co., Racine, Wis.*

Steel Strap Cutter

Cutting flat steel strappings up to ¾ in. x .035 in. with a minimum of effort is one of the features of the Acme strap cutting tool. A band guide is used to prevent straps from wedging sidewise between the blades, and the lower blade is made flat so that it can be easily inserted beneath tensioned straps. Measuring 9½ in. long, the tool weighs one pound. *Acme Steel Co., Department 30 P, 2840 Archer Avenue, Chicago.*

Stoker feeder

The Flo-Matic Stoker feeder is a 16 ft. slow speed screw conveyor that takes material, such as hogged wood, sawdust, or coal from storage to boiler stoker. It is easily adaptable to most boiler rooms and can be used in connection with present stoker. Variable screw speed drive. *American Coal Burner Co., Inc., 18(B) East Erie St., Chicago, Ill.*



Roller Paste Applicator

The Weber paste applicator can be used to replace paste pots, which must be filled manually and forced by hand to the applicator, on any machinery where adhesive application is required by rollers. Viscous paste is continually pumped from a container to a small reservoir located on the machine in which the application roller rotates to pick up the paste for distribution. Excess adhesive pumped to the reservoir is returned to be used over again to the pump and container by means of a special arrangement. Can be used on bag machines, carton and envelope machinery, gluers and labelers. *H. G. Weber & Co., Inc., Kiel, Wis.*

Resilient-base motors

Single-phase, capacitor, induction motors are now offered with a resilient-base construction for use where freedom from vibration and extra-quiet operation are required. Available on motors rated from ½ to 5 h.p., the Tri-Clad motor also offers protection against physical damage, electrical breakdown, and operating wear and tear. *General Electric, Schenectady 5, N.Y.*

Handling machine

The multi-function lift carriage assembly of the Baker Industrial Truck Div. makes it possible to convert in less than a minute from fork-spacer and clamp to side shifter on a 2000 to 4000 lb. capacity fork truck. The conversion is made by changing one pin

and block. Lateral movement of the forks in each case is operator-controlled by a lever located on the dash. Action is hydraulic, with roller conveyor chain linkage. With drum shoe attachments for use with clamping action the 36 in. unit will handle drums and other cylindrical objects up to 24¾ in. in diameter. *The Baker-Raulang Co., 1250 West 80th St., Cleveland 2, Ohio.*

New Products Briefs . . .

GLASS PAINT—A translucent glass paint reduces glare and heat. Known as Sunshade Blue, it is weather-proof and can be applied by brush or spray-gun. *Rex Supply Co., 142 S. Highland Ave., Ossining, N. Y.*

MIXING DEVICE—The "Dispersator" is used for emulsification, dispersion and mixing of liquids with other liquids, solids, or gases where propellers are ineffective. Centrifugal force resulting from high speed cylinder forces the product outward through slots in cylinder for mixing. *Premier Mill Corp., 218 Genessee St., Geneva, N. Y.*

HEATED MIXER—A gas-fired mixer, for processing under heating conditions more controlled than those of standard steam or hot water jacketed units, uses four ring-type gas burners. They are rated at 300 cfm and burn manufactured gas. Inner mixing tank is 36 in. in diameter and 36 in. high. *L. O. Koven & Brother, Inc., 154 Ogden Ave., Jersey City 7, N.J.*

TACHOMETER—The Metro tachometer, employing simple machine selector knob, measures speeds of many machines from one location. Many scale range markings and units available from any speeds between 1/10 rpm and 100,000 rpm. *Metron Instrument Co., 432 Lincoln St., Denver 9, Col.*

SYNTHETIC RUBBER FLOORING — Features high resistance to acids, alkalis, water and other destructive agents. No preliminary bonding with wood, metal, concrete or similar bases necessary. Withstands point loads of considerable weight. *Flash-Stone Company, Inc., 30 E. Rittenhouse St., Philadelphia 44, Penna.*

ELECTRIC POWER DRIVES—The larger horsepower "Speed-Trol" provides positive adjustment of pulleys, infinite speed variation and accurate control of speed under varying loads. Available in "Drip-Proof" models, 20 to 25 hp. range, and with manual or remote control. *Sterling Electric Motors, Inc., 5401 Anaheim-Telegraph Road, Los Angeles 22, Calif.*

FLOOR PATCHING COMPOUND — Holes or breaks in concrete floors can be readied for heavy loads in maximum of one hour with this quick setting "Por-Rok" cement. Self-bonding and no trowelling. *Hallemite Mfg. Co., 2446 West 25th St., Cleveland 13, Ohio*

ROTATING TRUCK CLAMPS — Self-centering arms with a maximum range of 66 in. are the feature on this hydraulically operated clamp for picking up bales, drums, etc. up to 6,000 lb. and transporting them on the centerline of the truck. Gasoline or electric truck installation. *Yale & Towne Mfg. Co., 11000 Roosevelt Blvd., Philadelphia 15, Penna.*

CUTTING BLADES — The Clipper Diamond Blades and Concrete Saw are adapted for cutting of 1-inch-depth concrete up to 10 ft. per minute and asphalt up to 12 ft. per min. Saw diameters from 8 in. to 18 in. are usable on any concrete saw. *Clipper Mfg. Co., 2800 Warwick, Kansas City 8, Mo.*

GRAVURE INKS—Day-Glo fluorescent inks are now produced for both sheet-fed and web-fed gravure presses. Letterpress and offset inks not yet available. *Fred'k H. Levey Co., Inc., New York.*

CAPACITOR MOTORS—The totally enclosed fan-cooled GE capacitor motors are designed for use in dirt, grit, or moisture areas. Available in 1, 1½, 2, 3 and 5 hp. *General Electric, Schenectady 5, N.Y.*

HIGH CAPACITY SWITCH—The Micro switch has added a rigid lever actuation for basic switches in a "V" series of "Type A." Offers lower operating force than flexible leaf actuated switches. Choice of levers. *Micro Switch, Freeport, Ill.*

RUSTFREE STEELS—This series of electro steel alloys offers improved corrosion resistance, especially against different concentrations of sulphuric acid and other corrodents. All "Super Rustfree" alloys are weldable. *Uniworld Research Corp. of America, 1302 Ontario St., Cleveland 13, Ohio.*

EXPANDING TUBE THERMOSTAT—Designed to eliminate common difficulties by using a stainless steel tube as the expanding member for controlling temperatures up to 600 F. Made in three types. *Smith Control & Instrument Corp., Palmyra, N.J.*

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The Paper Industry New Literature

Books

DYNAMIC MOTION AND TIME STUDY. By James J. Gillespie. Published by Chemical Publishing Co., Inc., 26 Court St., Brooklyn 2, N. Y. 140 pages. 8½ x 5½. $3.75.

The author, a management consultant, analyzes many of the time and motion studies that have been made in the past, while at the same time discussing his theories and their application to modern industry.

Motion study, according to the author, has become a complex, unwieldy technique, which he calls micromotionism. There is too much emphasis, he says, on motion cameras, therbligs, micromotion clocks, lights placed on the limbs of the operator, and useless simo charts. With the wide acceptance and publication of such principles as minimum movements, he continues, motion study has divorced itself from practical, humanitarian knowledge.

In this book work activity is related to work psychology. There are psychologies of nearly everything but work, and that a work psychology is here developed and applied will be of interest to the reader.

Subjects discussed in this volume include the study of human motion, the whole industrial pattern, the job whole, operator study, motion rhythm and harmony, physical job analysis, body posture and motion, dynamic symbolism, relaxation and other allowances, and practical application of motion study.

CONSULTING SERVICES, 13th edition. Published by the Association of Consulting Chemists and Chemical Engineers, Inc., 50 East 41st St., New York 17, N. Y. 136 pages. Paperbound. 8 x 10¾. No charge.

A carefully indexed list of consultants and consulting firms that are members of the Association of Consulting Chemists and Chemical Engineers, the volume is a handy reference text for industries using chemical processes. It contains geographical, alphabetical and classified listings, as well as brief summaries of the qualifications and activities of each member. Branch offices, domestic and foreign, are given. There are 17 consultants listed who do specialized work for the paper industry and an additional 13 who are qualified for such work.

DESIGNS, BORDERS, BACKGROUNDS, TINTS AND PATTERNS, edited by Harry B. Coffin. Published by Studio Publications, Inc., and Thomas Y. Crowell Co., 432 Fourth Ave., New York 16, N. Y. 80 pages. 9¼ x 12¼. $4.50.

The purpose of the book is to furnish the reader with a variety of well-designed material that can be used, without further permission, for graphic or decorative purposes. Aimed principally at layout men, commercial artists, art directors, art editors, decorators and advertisers, this volume provides 76 pages of borders, tints, patterns, and ornaments that may be cut out and pasted up in designing or preparing dummy layouts. A specific design can be made larger or smaller by the photostatic process, or it can be reversed. In addition, the design may be filled in to form a silhouette, it may be colored, reproduced in halftone rather than line, or changed or adapted by an artist in any way desired for a particular purpose.

FOREST POLICY, LAW, AND ADMINISTRATION. By T. Francois. Published in Rome, Italy, by the Food and Agriculture Organization of the United Nations. 211 pages. Paperbound. 9 x 6. $2.00. (Available through International Documents Service, Columbia University Press, 2960 Broadway, New York 27, N. Y.)

Compiled under the authorization of the United Nations, this volume summarizes work being done throughout the world in the various phases of forest conservation. The author is chief of the policy section, Division of Forestry and Forest Products of the Food and Agriculture Organization.

Preservation of the fertility of the land, and therefore of the forests, is a vital and crucial problem. When the abuses of exploitation reach such proportions that they radically modify the soil and local climatic conditions the existence of the forest is menaced.

The book covers three aspects of the over-all problem: Forest Policy, Forest Law and Regulations, and Forest Administration. Under subheadings the following subjects are discussed: principles of forest conservation and economic development, principles of sustained and maximum yield, objectives and limitations of forest law, defining and classifying lands, legal forms of forest ownership, protection against abuses by man, protection against natural forces, laws on exploitation, wood-using industries, and trade in wood, general aims and special characteristics of forest administration, and forest research organization.

INDUSTRIAL WASTES, Their Conservation and Utilization. By Charles H. Lipsett. Published by Atlas Publishing Co., Inc., 425 West 25th St., New York 1, N. Y. 317 pages. 9 x 6. $5.00.

Written in a semi-technical style by a recognized expert in the field of waste materials, this volume covers a wide range of scrap byproducts produced and utilized by industry.

The reader is given an acquaintanceship with the sources of supply of scrap and waste materials, how and by whom they are produced, how they are bought and sold, how they are handled and processed so that they are again suitable for use in making other commodities. Of the 51 chapters, four are directed at the paper industry, while three deal with the wood industry in general, and several additional sections discuss allied fields.

Subheadings in the chapters that are directed at papermaking include such subjects as veneer chips, satisfactory fiber, hardwoods for pulpmaking, old crosstie kraft paper, rag cooking, rag washing, rag bleaching, rag beating, rag papermaking problems, synthetic fibres, wastepaper handling, processing wastepaper, color testing, deinking process, cooking and bleaching, fine screening, alkali deinking, and final processing.

Booklets and Pamphlets

ANNUAL REPORT OF THE NATIONAL BUREAU OF STANDARDS FOR 1950. Published by the National Bureau of Standards, U.S. Department of Commerce, Washington 25, D.C. (miscellaneous publication No. 200). 113 pages. 50 cents. This illustrated publication summarizes the scientific investigations conducted by NBS during fiscal 1950. The activities in 13 scientific and technical divisions are reported, as well as current activities.

GAS-ANALYSIS MANUAL. By Maryan P. Matuszak. Published by Fisher Scientific Co., 717 Forbes St., Pittsburgh 19. 60 pages. 7 x 10. In this fourth revised edition Fisher Co. presents directions for assembling various gas-analysis apparatus of the Orsat type; furnishes complete but brief directions for making gas analyses to operators with no previous training; presents some new time-saving techniques to operators already familiar with gas analysis, and describes recent developments in modern analysis equipment. References are given.

STANDARDS OF HEAT EXCHANGE INSTITUTE: BAROMETRIC AND LOW LEVEL JET CONDENSERS. Published by Heat Exchange Institute, 122 E. 42nd St., New York 17, N.Y. 23 pages. 8½ x 11. $1.00. This booklet presents standards set forth by the Institute. Included are sections on nomenclature, types, design, definitions, performance, performance calculations, construction, vacuum pump capacity, installation, atmospheric relief valves, air-water vapor mixture data, and pressure-temperature conversion tables.

LUMBER PRODUCTION MAPS FOR SOUTHERN FOREST SURVEY TERRITORY. Published by Forest Service, U.S. Department of Agriculture, Southern Forest Experiment Station, Lowich Bldg., New Orleans 13. The location, species, and volume of lumber production in seven southern states are described. Included are 28 maps showing

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where lumber was sawn in 1946 in Alabama, Arkansas, Louisiana, Mississippi, Oklahoma, Tennessee, and Texas. Dots on the maps represent given amounts of lumber and approximate locations.

Manufacturers' Publications

Through the co-operation of manufacturers and suppliers, THE PAPER INDUSTRY *lists the following catalogues, bulletins and booklets. They may be obtained without cost or obligation, unless otherwise specified by writing direct to the manufacturers. Please address requests on your company letterhead.*

Centrifugal Sump Pumps. Warren Steam Pump Co., Inc., Warren, Mass.—This eight-page bulletin (WQ-220) covers Types VS and VN centrifugal sump pumps, which are available in wet and dry pit types to handle clear liquids, sewage, and other liquids containing solids.

Constant Delivery Pumps. Oilgear Co., 1560 W. Pierce St., Milwaukee 4, Wis.—Three constant delivery axial piston pumps for pressures up to 3,000 and 5,000 psi are described in a four-page bulletin (46601). The units are suitable for heavy-duty pushing, pulling, lifting and lowering, and for maintaining high static loads on large clamping rams.

Colloidal Silica. Monsanto Chemical Co., Merrimac Division, Everett, Mass.—Syton C-30 for emulsion type waxes, water-based finishes, textiles, latex and other products is described in a new bulletin. Another application is the modification of paper to improve wettability, absorption, and other surface characteristics. General properties are given.

Molded Products. Keyes Fibre Sales Corp., 420 Lexington Ave., New York 17, N.Y.—This 56-page handbook gives technical instruction (plates and dishes, pie plates and cake circles, salad and utility bowls, egg cartons and egg trays, apple packs and lettuce pads, prepackaging trays and food dishes) gives complete descriptions, specifications, and blueprints, tabulations of dimensions, sizes and shapes.

Drives. Black-Clawson Co., Hamilton, Ohio—Described in this eight-page bulletin (1-BC) are spiral bevel, hypoid, calender reversing, extended shaft, double reduction, and inching gear drives; also Airflex and multiple disc clutches. Included is information on right-angle drives, engineered for paper mill applications.

Switches. Micro Switch (Div. of Minneapolis-Honeywell Regulator Co.), Freeport, Ill.—This four-page circular (bulletin No. 54) acquaints the reader in a general way with the firm's entire line of more than 5,000 snap-action switches. It catalogues, describes, illustrates, and gives applications for several representative switches.

Power Transmission Drives. Morse Chain Co., 7601 Central Ave., Detroit 8, Mich.—This new catalogue (C 72-51) gives data on HY-VO power transmission drives, including a description of basic operating principles, highlights of new design, description of capacity, and installation and lubrication procedures.

Spray Nozzles. Yarnall-Waring Co., Mermaid Lane, Philadelphia 18, Pa.—This 20-page bulletin (N-617) gives details covering Yarway involute nozzles for spray cooling ponds and corresponding information for smaller involute and flat-spray nozzles for industrial processes.

Welding Fittings. Tri-Clover Machine Co., 2809 60th St., Kenosha, Wis.—Tri-Clover describes their Schedule 5 and 10 IPS size stainless steel "Zephyrweld" fittings in this 16-page catalogue (1051). Complete information is given for each type fitting.

Beta Ray Gauge. Industrial Necleonics Corp., 1205 Chesapeake Ave., Columbus 12, Ohio.—This four-page bulletin (BG-1) explains the use of the beta ray gauge in the utilization traps. Listed are cast semi-steel and forged steel control in the continuous measurement of sheet materials directly on the production line.

Traps. Armstrong Machine Works, Three Rivers, Mich.—This 12-page catalogue gives data and prices on Armstrong steam and air traps. Listed are semi-steel and forged steel inverted bucket traps, ball float air traps, Y-type strainers, and internal check valves, in addition to data on calculation of condensate loads and selection of traps to handle these loads.

Car Pullers. American Hoist and Derrick Co., St. Paul 1, Minn.—A new eight-page catalogue (100-H-66) describes American Hoist's complete line of electric car pullers and provides suggested uses. Three puller types—capstan, drum, and continuous rope—are included.

Veneer-Lathe Drives. General Electric Co., Schenectady 5, N. Y.—Veneer-lathe drives with amplidyne control are illustrated and described in a four-page bulletin (GEA-5596) that demonstrates how new models are designed to give plywood producers high quality veneer, increased output, reduced waste, simplified lathe operation, reduced maintenance costs, and operational economy.

Tubing. Babcock and Wilcox Tube Co., Beaver Falls, Pa.—Data on creep stress for a number of tubing steels are given in technical data card 102. Data are given for rates of 1 per cent elongation in 10,000 and 100,000 hours at temperatures of from 800F to 1500F for various steels.

Pipe Joints. Gates Engineering Co., New Castle, Del.—The GACO rubber-lined pipe joint system is outlined in a catalogue just released. Also included is an engineering manual containing a complete list of fittings and specifications and a list of corrosives to which the system is resistant.

Traps. W. H. Nicholson & Co., 12 Oregon St., Wilkes-Barre, Pa.—This 32-page illustrated catalogue describes thermostatic steam traps, expansion steam traps, weight-operated traps, piston-operated steam traps, and steam, air and gas separators. Includes capacity tables and installation diagrams.

Tachometer Indicators. Metron Instrument Co., 432 Lincoln St., Denver 9, Colo.—Technical data sheet No. 42R describes Metron's multiple head, single range, fixed installation tachometer indicatory for monitoring speeds of many remotely located machines from one convenient location.

Refiners. Bauer Bros. Co., 1759 Sheridan Ave., Springfield, Ohio.—Bulletin No. 52 illustrates and describes in eight pages the Bauer line of attrition mills, pulp refiners, hammer mills, crushers, breakers, magnetic separators, specific gravity separators, cleaners, defibrators, exhausters, vegetable oil machinery, nut processing machinery, laboratory mills, beaters, and classifiers.

Laboratory Equipment. Andrew Technical Service, 3805 N. Clark St., Chicago 13, Ill.—Bulletin No. 515 (16 pages) describes equipment including portable autoclaves, midget refrigerator, vacuum control manostats, motor-driven blender, Rotameter flowmeter, flash evaporator for heat sensitive solutions, stainless steel filters, stop watches, stainless steel needle valves, non-corrosive pumps, and a selection of laboratory sundries.

Heat Transfer. Struthers Wells Corp., Warren, Pa.—A new standard line of electrically heated Dowtherm heat transfer units is described in bulletin No. B-45. The heaters have capacities ranging from 100,000 to 500,000 BTU's per hour and have a temperature range to about 750F.

Pillow Blocks. W. A. Jones Foundry & Machine Co., 4401 W. Roosevelt Rd., Chicago 24, Ill.—Catalogue No. 88 gives information on the construction, application, and installation of Jones Timken equipped pillow blocks. Included are engineering data, bearing capacities, lubrication information, dimension drawings, types, sizes, etc.

Truck Lubrication Chart. Hyster Co., 2902 N. E. Clackamas St., Portland 8, Ore.—This 26-point lubrication chart (form 1102) covers eight Hyster industrial truck models.

Process Equipment. Electric Steel Foundry Co., 2141 N.W. 25th Ave., Portland 10, Ore.—This 68-page catalogue (No. 175) covers special equipment for the pulp and paper, chemical, food processing, mining, construction, and petroleum industries. The listings are according to corrosion, abrasion, and heat resistant characteristics. The chemical composition and mechanical properties of ESCO alloys are charted and discussed, as well as specifications for fittings, flanges, valves, pipe, and tubing.

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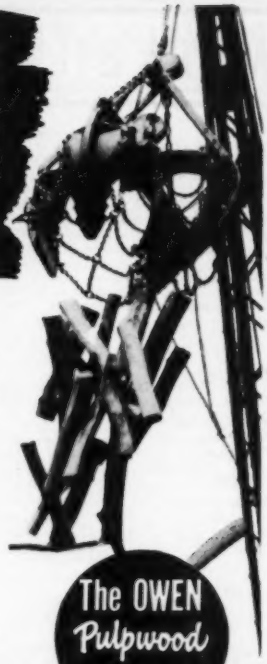

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Layne
WATER SUPPLY
WELLS & PUMPS

MARKET QUOTATIONS

RAGS (Domestic)

NEW RAGS

The following are OPS ceiling prices, cents per pound, delivered mills:

	per cwt.
Blue Overalls	14.50
Corduroy	8.00
Washables, No. 1	6.50
Percales	12.50
Light Prints, No. 1	11.50
Khaki Cuttings—	
Sun Tan	11.50
Mixed	8.00
New White Canvas	19.00
Canton Flannels, bleached	21.00
Canton Flannels, unbleached	21.00
Shirt Cuttings—	
New White No. 1	21.00
Silesias No. 1	16.00
New Unbleached	21.00
Fancy	10.00
Linen Cuttings—	
American	14.50
White	21.00
Grey	21.00

RAGS (Domestic)

OLD RAGS

Quotations to consuming mills, dollars per hundred pounds, f.o.b. New York, follow:

	per cwt.
Roofing—	
No. 1	1.80 to 1.90
No. 2	1.40 to 1.50
No. 3 and 4	1.20 to 1.40
Twos and Blues—	
Repacked	4.75 to 5.00
Thirds and Blues—	
Repacked	4.25 to 4.50
Miscellaneous	3.75 to 4.00
Whites, No. 1—	
Repacked	5.75 to 6.00
Miscellaneous	4.50 to 4.75
White, No. 2—	
Repacked	3.75 to 4.00
Miscellaneous	3.25 to 3.50

RAGS (Foreign)

ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shoppers	

ROPE and BAGGING

f.o.b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	6.50 to 6.75
Domestic	6.50 to 6.75
Wool Tares—	
Light	8.50 to 9.00
Heavy	9.00 to 9.50
No. 1 Scrap Bagging	5.50 to 6.00
Manila Rope—	
No. 1 large	9.50 to 10.00
No. 1 small	9.00 to 9.50
Sisal Rope—	
No. 1 large	8.50 to 9.00
No. 1 small	8.00 to 8.50
New Burlap Cuttings	8.00 to 8.50
Jute Threads—	
Foreign (Nom.)	8.00 to 8.50
Domestic	8.00 to 8.50
Strings—	
No. 1 sisal	5.50 to 5.75
No. 2 sisal	5.00 to 5.25
Soft jute	5.25 to 5.50
Mixed	3.50 to 3.75

WASTE PAPER

The following are quotations, dollars per ton, for No. 1 packing f.o.b. New York:

	per ton
Shavings—	
Hard White Env. Cuts	225.00—
Hard White, No. 1	175.00—
Soft White, No. 1	120.00—
Soft White, one-cut	140.00—
Soft White, Misc.	105.00—
Fly Leaf, No. 1	70.00—
Fly Leaf, Woody No. 1	55.00—
No. 2 Mixed Col. Woody	45.00—
Flat Stock—	
No. 1 Heavy Books and Magazines, Repacked	42.00—
Mixed Books	28.00—
Ledger Stock—	
No. 1 White	110.00—
No. 1 Mixed (Colored)	85.00—
Manilas—	
New Env. Cuttings	130.00—
New Env. Cuts, One-Cut	—
Extra Manilas	85.00—
Manila Tab Cards, Free of Ground Wood	150.00—
Colored Tab Cards	110.00—
Kraft—	
New Envelope Cuttings	130.00—
Tripled Sorted No. 1 100%	85.00—
No. 1 Old Assorted	65.00—
News—	
White Blank	85.00—
Overissue	22.00—
No. 1 Folded	18.00—
Old Corrugated Containers	30.00—
New Jute Corrugated Cuts	36.00—
Mill Wrappers	18.00—
Box Board Chips	16.00—
No. 1 Mixed Paper	16.00—

CHEMICALS

f.o.b. shipping point

Alum (Papermakers)—	
Lump, cwt.	4.55—
Ground, cwt.	4.30—
Powdered, cwt.	4.70—
Blanc Fixe—	
Pulp, bulk, ton	90.00—
Dry, barrels	95.00—
Bleaching Powder—	
Drums, cwt.	5.00 to 6.00
Casein (Domestic Standard)	
20-30 mesh (bags), lb.	
80-100 mesh (bags), lb.	39.00 to 40.00
Argentine, lb.	39.00 to 39.50
China Clay—	
Domestic Filler Bulk (mine) ton	10.00 to 15.00
Domestic Coating Bulk (mine) ton	15.00 to 25.00
Imported (ship side) Bulk (lump) ton	22.00 to 30.00
Chlorine—	
Tank cars (wks) cwt.	2.80 to 3.05
Gelatine (silicin), lb.	1.25 to 1.35
Glye. (C.P.) drums, lb.	.50 to .55
Litharge, powd. bbl. lb.	.18¾ to .20

Rosin (Gum)—	New York, per 100 lbs.
E	9.85—
F	9.85—
G	9.85—
WW	10.25—
Rosin (Wood), carlots, F.O.B. South	6.00 to 6.25

MARKET QUOTATIONS

Salt Cake—		
Dom. bulk (wks) ton	23.00 to	24.00
Imp. bulks on dock— (Atl. ports) ton (Nom.)	25.00—	
Soda Ash—		
Bulk (works) cwt.	1.20—	
Paper bags, cwt.	1.50—	
Soda (Caustic)—		
Solid drums, cwt.	3.35 to	3.40
Ground and flake, drums, cwt.	3.75 to	3.85
Sodium Silicate—		
60 deg. 55 gal. drums, (works) cwt.	1.80 to	1.90
40 deg. 35 gal. drums, (works), cwt.	1.50 to	1.60
Starch—		
Pearl, 140 lb. bags, cwt.	6.09—	
Pearl, barrels, cwt.	6.09—	
Paper (Sp.) bags, cwt.	6.09—	
Powdered, barrels, cwt.	6.32—	
Sulphur (Crude)		
(Mine) bulk, long ton	22.00—	
Talc—		
Dom. 100 lb. bags (mine) ton	25.00 to	28.00
Canadian	35.00 to	45.00
Titanium Dioxide—		
Barium Pig, bbls., lb.	.21 to	.21½
Calcium Pig, bbls., lb.	.21 to	.21¼
Zinc Sulphide, bbls., lb.	11.50 to	11.75

WOOD PULP

The following are OPS ceiling prices on domestic wood pulp, dollars per short air dry ton delivered consuming mills including the basic maximum freight allowances as provided:

Bleached sulphite	140.00—
Unbleached sulphite	132.50—
Bleached sulphate	145.00—
Semi-bleached sulphate	140.00—
Unbleached sulphate	132.50
Bleached soda	140.00—
Ground wood	92.50—
Sulphite screenings	72.50—
Sulphate screenings	67.50—
Ground wood screenings	60.00—
Unbleached sulphate siderurs	92.50—
Standard news print siderurs	132.00—

OPS ceiling prices on European wood pulp, dollars per short air dry ton, on dock at American Atlantic ports, folow'

Bleached sulphite	225.00—
Bleached sulphate	230.00—
Unbleached sulphite	200.00—
Unbleached sulphate	200.00—

PAPER

f.o.b. New York City

Boards—	per ton
Binders	140.00—
Chip	105.00—
Chip, tube and can	115.00—
Chip, full blending	117.50—
Chip, sgl. mla. lined	130.00—
Coated, white patent .016	170.00 to 180.00
.020 and heavier	160.00 to 170.00
Kraft liner	115.00—
Filled News	107.50 to 110.00
Container	130.00—

Book Papers—f.o.b. mill with quantity, weight, manufacturing and other differentials allowed:

(Per cwt. in ton lots)
Uncoated (Untrimmed)

Book, White (M. F.)—	
A Grade E. F.	18.15—
B Grade E. F.	18.40—
A Grade S. C.	18.65—
B Grade S. C.	17.40—
No. 2 Uncoated Offset 4 sides, White	—
Machine Coated White	
No. 1 Glossy	23.90—
No. 2 Glossy	22.15—
No. 3 Glossy	21.90—
No. 4 Glossy	—
No. 2 Offset	18.65—
C1S Litho (Varnish)	—
C1S Litho (Non-Varnish)	—

Writing Papers—f.o.b. mill with zone, quantity, packing and other differentials allowed:

Rag Content Bond— (In Ton Lots)	per cwt.
Extra 100% Rag	70.45—
100% Rag	62.45—
75% Rag	49.15—
50% Rag	38.90—
25% Rag	31.65—

Rag Content Ledger— (In Ton Lots)	per cwt.
Extra 100% Rag	72.65—
100% Rag	63.90—
75% Rag	49.40—
50% Rag	40.20—
25% Rag	33.00—

Sulphite Bond—	per cwt.
Air dry, watermarked	—
No. 1 watermarked	19.05—
No. 2 watermarked	18.10—
No. 4 watermarked	17.10—

Sulphite Ledger—	per cwt.
No. 1 watermarked	21.15—
No. 2 watermarked	21.00—
No. 4 watermarked	20.40—

Glassine (f.o.b. mill)—	per cwt.
Embossed (25 lb. up)	—
Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—
Greaseproof—	
Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—

News—	per ton
Rolls, Standard (Contract)	114.00 to 116.00
Rolls (Spot)	(Nominal)
Sheets	130.00—

Tissues (Carlots)—	per ream
White No. 1	2.25—
White No. 2	1.85—
Bleached Anti-Tarnish	—
Colored	2.20—
Anti-Tarnish Kraft	2.10—
Manila	2.20—
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	.90—
Napkins, full crepe and embossed (12½ lb. to M shts.) per cs.	.90—
Toilet, Bleached (M shts.) per cs.	9.85—
Toilet, Unbleached (M shts.) per cs.	6.60—

Towels	per case
Bleached	6.65—
Unbleached	5.65—

Wrappings (Kraft)—	per cwt.
Super-Standard	9.25 to 9.50
No. 1 Wrapping	8.25 to 8.50
Standard Wrapping	7.75 to 8.00
Standard Bag	7.50 to 7.75
Variety Bag	—

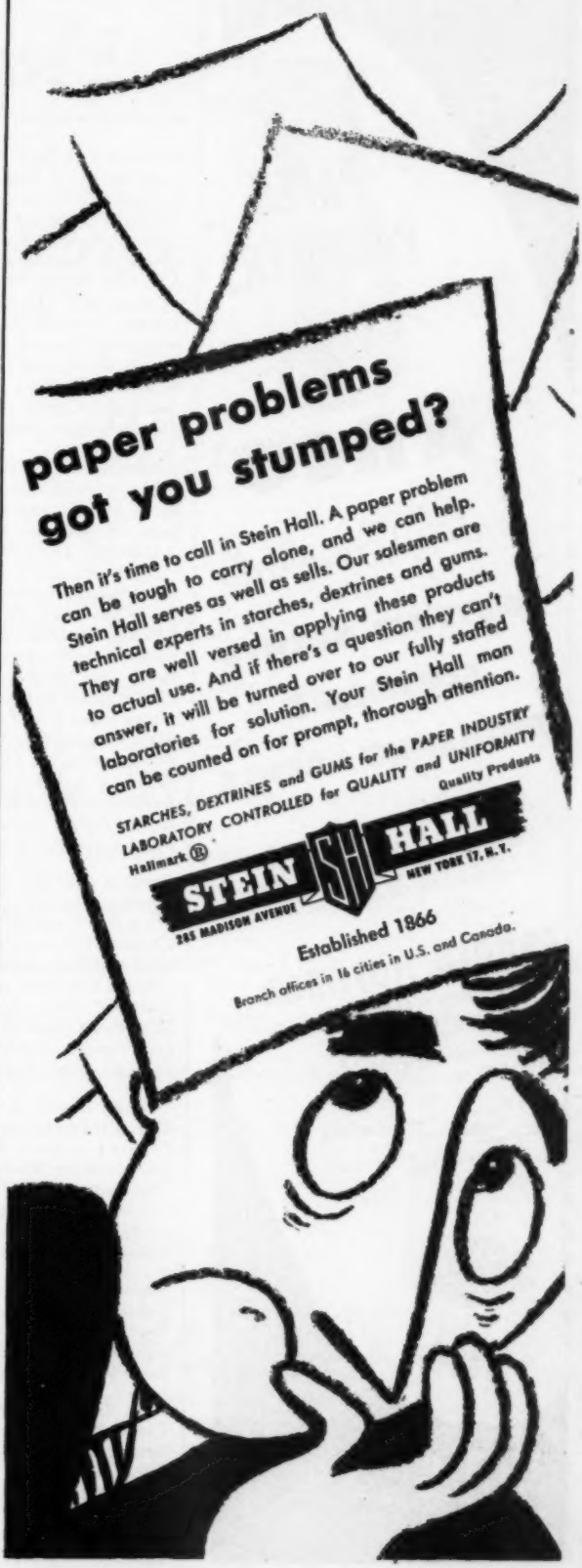
Wrappings (Sulphite and Bleached Kraft)— (Rolls, f.o.b. mill)

Bleached Papers—	per cwt.
M.F. & M.G. Waxing, 20 lb. (carloads only)	—
(10,000 lb.)	—
Drug wrapp., 35 lb.	—
Unbleached Papers	
Com. Gr. Butch. 40 lb.	
No. 1 Butchers	—
No. 1 Imit. Parch. & Dry Fin. Groc. Sulphite, 30 lb.	—
No. 2 Imit. Parch. & Dry Fin. Groc. Sulphite, 30 lb.	—
Steam Finish, 50 lb.	—
Water Finish, 50 lb.	—

Manilas—	
Envp. Mla., Sub. 18-40 (No. 1)	—
Env. Mla., Sub. 16-28 (No. 2)	—
Envp. Mla. (Prices based on large sheets untrimmed ream marked, in bdls.)	—

Wrapp. Mla. 35 lb. up—	
No. 1	8.75 to 10.25
No. 2	—

M.G. Sulphite and Kraft (other than Waxing)	
Grade B-20 lb.	—
Grade A-22 lb.	—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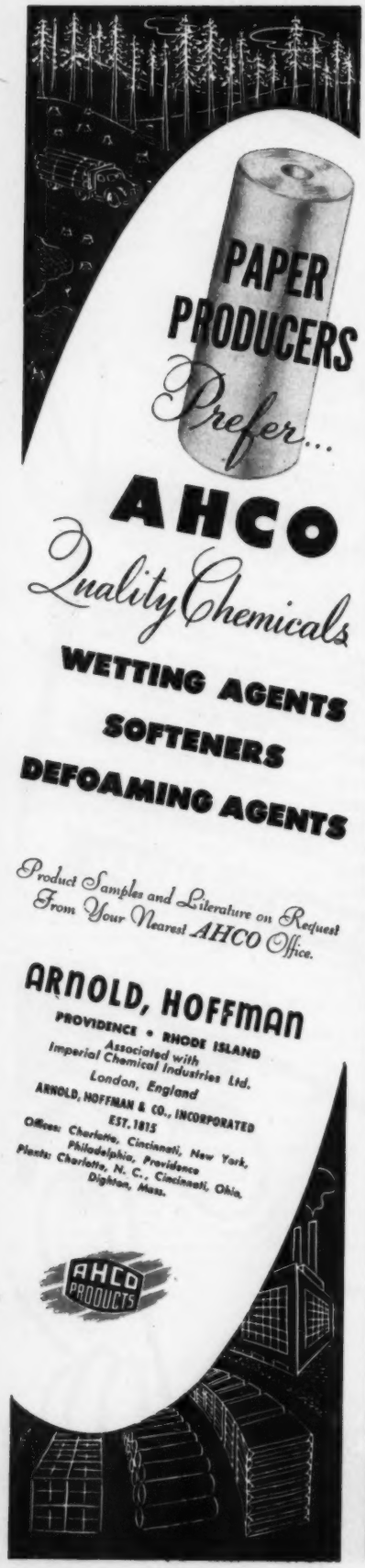

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